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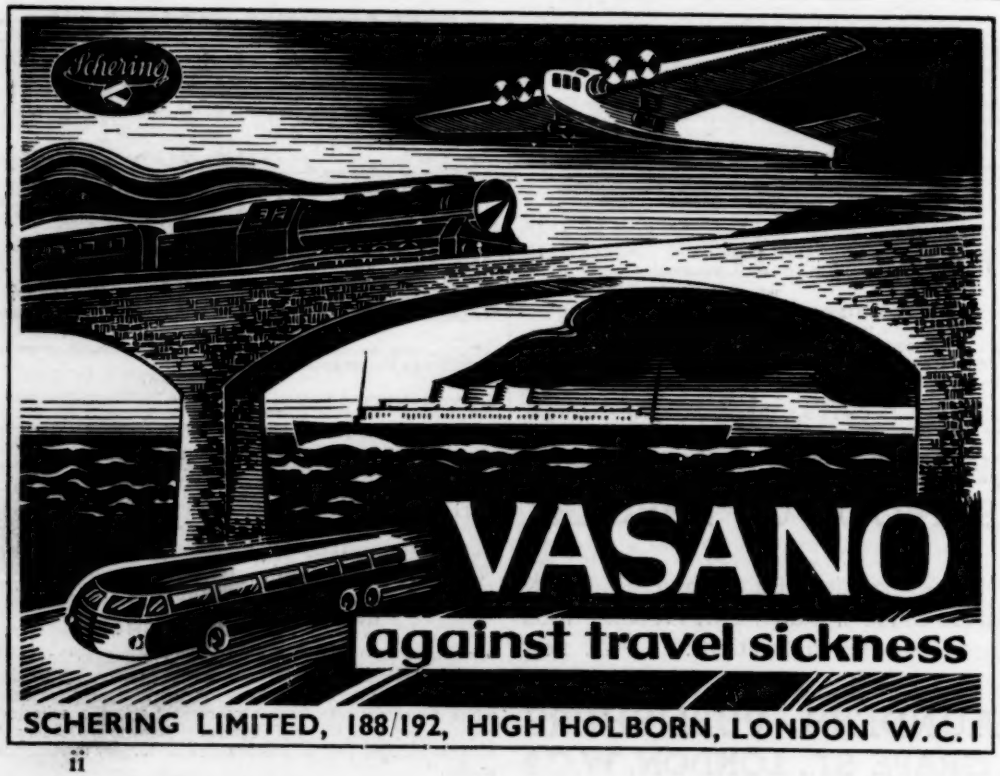

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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT

ADDRESSES AND ORIGINAL ARTICLES

Glycogen and the Metabolism of Carbohydrate. By F. G. YOUNG, Ph.D. Lects. III. and IV..... 297

Operative Treatment of Severe Gastric Hæmorrhage of Ulcer Origin. By Prof. HANS FINSTERER, M.D. 303

The Location of Cerebral Tumours by Electroencephalography. By W. GREY WALTER, M.A.—(*Illustrated*)..... 305

Decreased Gonadotropic Hormone Production during Pregnancy associated with Increased Intracranial Pressure. By W. R. HENDERSON, F.R.C.S., and J. M. ROBSON, M.D. 308

Allergic Reactions to the Schick Test. By H. J. PARISH, M.R.C.P..... 310

REVIEWS AND NOTICES OF BOOKS

The Extra-Ocular Muscles. By Prof. L. C. Peter, M.D. 317

Manual of Emergencies. By J. Snowman, M.R.C.P..... 317

Recent Advances in Genito-Urinary Surgery. By Hamilton Bailey, F.R.C.S., and N. M. Matheson, F.R.C.S. 318

Handbook of Surgery. By Eric C. Mekie, F.R.C.S. 318

A Manual of the Common Contagious Diseases. By P. M. Stimson, M.D..... 318

LEADING ARTICLES

HYPERTENSION: THE HEN AND THE EGG..... 319

VIRUSES AND NEW GROWTHS 319

PERSPECTIVES IN NEUROPHYSIOLOGY 321

ANNOTATIONS

The Certifying Surgeon.... 322

Ear Disease in the Army.. 322

The "Safe Period"..... 322

Books for Sanatoria..... 323

Results of Treatment of Tibial Fractures..... 323

Amino-Acetic Acid for Anorexia..... 324

League of Nations and Narcotic Drugs..... 324

L.C.C. Mental Hospitals and G.P.I..... 324

Circulation During Spinal Anæsthesia..... 325

Rating of Hospitals..... 325

Æsculapius in Russian Uniform 325

PROGNOSIS

CX.—Lumbago and Sciatica. By A. H. DOUTHWAITE, F.R.C.P. 326

SPECIAL ARTICLES

British Medical Association:

Sections of Anæsthetics and Obstetrics and Gynecology: Anæsthetics in Labour 311

Section of Neurology and Psychological Medicine: Delirious States—Phantom Limbs..... 312

Section of Medical Sociology: Medical Problems of School Life..... 315

Russia To-day: Medicine Under Socialism.—I: Repairs Under Steam—Sanatorium and Hospital—The Citizen—Medicine for the Peasant..... 328

Medicine and the Law; What is a "Newly Born" Child?—The Verdict of "Guilty but Insane"—Failure of Communications at Hospitals..... 336

Ireland: The Health of Cork..... 343

Second International Congress for Microbiology: Staining of Elementary Bodies—Immunity Reactions in Relation to Antigenic Structure and Variation in Bacteria—Factors Influencing Malaria Transmission in *Nature*—Microbiology of Canned Foods—The Banquet.—(*Concluded*).. 331

Annual Irish Medical Luncheon 333

Medical Directory: Uncommunicated Addresses 334

GRAINS AND SCRUPLES

From a London Surgeon... 338

PUBLIC HEALTH

The Overcrowding Survey—L.C.C. Hospitals and Houses 342

Infectious Disease in England and Wales..... 343

CORRESPONDENCE

Air-raid Precautions (Mr. T. B. Layton, F.R.C.S.) 344

Grains and Scruples..... 344

Tuberculosis Contacts (Dr. L. B. C. Trotter)..... 345

Convalescent Serum for Undulant Fever (Dr. H. J. R. Kirkpatrick)... 345

Miner's Nystagmus (Dr. G. Arbour Stephens)..... 345

THE SERVICES

Royal Naval Medical Service—Army Medical Services—Royal Army Medical Corps—Royal Air Force—Deaths in the Services..... 337

INDEX NOTICE

Index to THE LANCET, Vol. I., 1936..... 325

OBITUARY

Sir Alfred Keogh, F.R.C.P.—(*With portrait*) 349

PARLIAMENT

Industrial Diseases and Accidents 346

Notes on Current Topics: Summer Adjournment—Notification of Measles—Milk in Schools..... 347

Question Time: Venereal Disease—Supply of Cheap Milk in Special Areas—Conditions of Appointment of Certifying Surgeons—Overwork of Young Persons in Industry—Ophthalmia Neonatorum..... 348

MEDICAL NEWS

Univ. of Cambridge..... 350

Roy. Coll. Phys. Lond..... 350

Roy. Coll. Surg. Eng..... 351

Soc. of Apothecaries..... 351

University of London..... 351

Scottish Conjoint Board... 352

Post-graduate Course in Paris 352

Inst. of Child Psychology.. 352

The New Surbiton Hospital 302

Dudley Guest Hospital.... 305

Tuberculosis in Cyprus 325

Congress of Synthetic Biology 341

Professional Classes Aid Council 348

NOTES, COMMENTS, AND ABSTRACTS

Hospital Reform 353

Hydrotherapy 353

New Preparations: Ammoket—"Benzedrine" Brand Tablets—Antivenomous Serum—Hydatid Fluid—Trisan 354

Winter in Egypt: Information Wanted..... 354

Medical Diary..... 348

Vacancies 352

Appointments 354

Births, Marriages, Deaths 354

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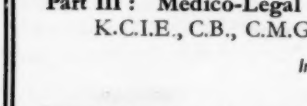

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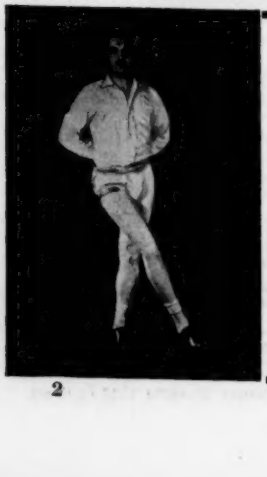

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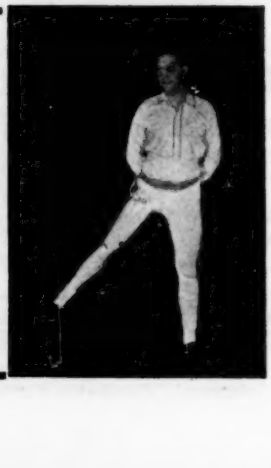

ADDRESSES AND ORIGINAL ARTICLES

GLYCOGEN AND THE METABOLISM OF CARBOHYDRATE *

BY F. G. YOUNG, Ph.D.
BEIT MEMORIAL FELLOW

III

Interpretation of Respiratory Quotient

THE classical interpretation of the non-protein respiratory quotient (R.Q.) rests on the assumption that fat is not converted to sugar in the body. For instance, a non-protein R.Q. of 0·7, such as obtains in pancreatic diabetes, is usually taken to indicate that fat only is being oxidised, whereas the interpretation that sugar is being formed in the liver from fat and oxidised in the muscles is equally possible and indeed more probable in the light of the discussion in the last lecture. It is clear, moreover, that if the formation of sugar from fat is admitted as a possibility then no interpretation of the R.Q. is possible without further data. It has been argued that the conversion of fat to carbohydrate does not occur, on the grounds that a R.Q. below the fat oxidation level of 0·7 has never been satisfactorily demonstrated, and such a process of conversion should lower the R.Q. of the whole body if the sugar formed were stored as glycogen. If, however, as was assumed in the last lecture, sugar is formed from fat only when carbohydrate is simultaneously being oxidised, then the R.Q. of the whole body would not fall below that for fat oxidation, the nature of the intermediates in the oxidative reaction having no influence on the R.Q. of the whole process.

Recently some who believe that the non-protein R.Q. of the depancreatised dog is really at the fat oxidation level have admitted, on the basis of Mann's experiments, that the tissues of the depancreatised dog are capable of oxidising small amounts of sugar. The implication of this admission is perhaps not always realised. For if the non-protein R.Q. of the whole animal is 0·7 and sugar is being oxidised in the tissues at a R.Q. of unity, then there must be some reaction simultaneously proceeding in the body with a R.Q. below 0·7, of which by far the most probable is the conversion of fatty acids to sugar. If the tissues of an animal whose non-protein R.Q. is 0·7 are actually oxidising sugar then the classical interpretation of the R.Q. will have to be reconsidered.

Factors Concerned in Control of Blood-sugar Level

The remarkably small variations which the blood-sugar level of the normal animal undergoes implies a nicety of balance between sugar production in the liver and sugar utilisation in the extrahepatic tissues. As far as is known this balance is controlled by four principal factors: adrenaline secreted by the adrenal glands, insulin liberated by the pancreas, nervous centres in the floor of the fourth ventricle and in the hypothalamus, acting directly or via the endocrine glands, and finally by a factor or factors secreted by the anterior pituitary gland; the adrenal cortex may also be implicated. Probably the most important of these are adrenaline, insulin, and the pituitary secretions. The latter will be considered in the last lecture, but a brief summary will now be given of the influence of adrenaline and insulin on carbohydrate metabolism in general and on the blood-sugar level in particular.

Influence of (*a*) Adrenaline and (*b*) Insulin on Carbohydrate Metabolism

Adrenaline.—The administration of a minute dose of adrenaline (much smaller, in some cases, than that required to raise the blood pressure) causes a considerable rise of blood-sugar level, together with a rise in blood lactic acid. The liver-glycogen content is simultaneously decreased and it appears that the hyperglycæmia results mainly, if not entirely, from an increased breakdown of liver-glycogen, while the rise of blood lactate results from a stimulation of the breakdown of muscle-glycogen to lactic acid. An increased oxygen consumption usually follows adrenaline administration, but the R.Q. is altered little if at all.

Cannon [1] has presented evidence demonstrating that if the blood-sugar falls to about 70 per cent. of its normal value adrenaline secretion is stimulated and the fall of blood-sugar thus retarded. These effects are lacking in animals from which the adrenal medullæ have been removed, so that such animals are very sensitive to the hypoglycæmia action of insulin. Cannon therefore regards the increased secretion of adrenaline during hypoglycæmia as a protective measure, which in the presence of adequate liver-glycogen stores is able to counteract, and, in most cases, to abolish the hypoglycæmia.

Insulin.—One of the most striking effects of insulin administration is the rapid fall of blood-sugar. If the dose is large the normal blood-sugar level may not be regained for many hours. Insulin also rapidly lowers the blood-sugar and reduces the glycosuria in diabetes, and will also, in suitable circumstances, stimulate the rapid and complete disappearance of the diabetic ketosis; the latter effect is marked only in the presence of adequate supplies of sugar. If the blood-sugar level is lowered sufficiently, hypoglycæmic symptoms which can culminate in convulsions may occur; that these symptoms are due to the lowered blood-sugar level and not to the insulin per se is shown by the fact that they are completely antidoted by intravenous glucose administration. Administration of insulin is followed by a rise of the R.Q. both in a normal and in a diabetic animal.

The fate of the sugar which leaves the blood stream under the influence of insulin was investigated by Best, Dale, Hoet, and Marks,[2] who found that in the eviscerated cat receiving both glucose and insulin all the sugar disappearing could be satisfactorily accounted for by the rise in muscle-glycogen together with the amount of sugar oxidised as calculated from the R.Q. The earlier experiments of Cori and his colleagues (1923), in which an abdominal window was used to obtain blood samples from the portal and hepatic veins of unanæsthetised rabbits, had clearly shown that insulin considerably diminishes the rate at which sugar is secreted by the liver, and these results have received confirmation by the experiments of Kotschneff (1928) using the technique of angiostomy, and by other investigators. There is also some evidence that insulin is capable of antagonising, to some extent, the glycogenolytic action of adrenaline on the liver. Insulin has a variable action on the liver-glycogen, as although

* A synopsis of four lectures delivered at University College, London, on Jan. 16th, 23rd, 30th, and Feb. 6th, 1936. Lectures I. and II. appeared in THE LANCET last week.

the level is diminished in most animals it is raised after the injection of insulin into young rabbits (Goldblatt, 1929); it has no marked effect on the general metabolic rate nor on the nitrogen metabolism of the normal animal, although the increased protein katabolism of diabetes is diminished by injection of this hormone.

Control of Insulin Secretion

Although claims have been made to have demonstrated that a rise of blood-sugar level stimulates nervous centres which control the secretion of insulin, thereby causing an increased liberation of this substance into the blood stream, such claims have been controverted, and the existence of such centres is still a matter of doubt. It is clear, however, that the fasting blood-sugar level and sugar tolerance of animals whose only source of insulin is a completely denervated pancreatic graft are normal, so that centres in the brain do not play an essential part in the process whereby insulin assists in controlling the blood-sugar level. In some recent experiments Soskin and his collaborators [3] have been able to obtain normal sugar-tolerance curves in depancreatised dogs in which the blood-sugar level was maintained within the normal range by the constant intravenous infusion of insulin and glucose. That a normal rise and fall of blood-sugar level in response to administered glucose is obtained when insulin is being supplied at a constant rate is most interesting, and as Soskin suggests, the possibility that normally the body may not need to increase the secretion of insulin in order to dispose of ingested carbohydrate must be considered, although further experiments are needed before this view can be generally accepted.†

Houssay (1929) has observed that in animals in which the sole supply of insulin is from a denervated pancreatic graft the return of the blood-sugar level to normal after insulin hypoglycæmia is somewhat delayed; he attributes this to the exclusion of inhibitory nerve-fibres to the islets of Langerhans which normally reflexly inhibit the secretion of insulin in conditions of hypoglycæmia.

Control of Blood-sugar Level

Neglecting for the present the possible rôle of the pituitary gland we can say that the blood-sugar level is maintained within a limited range by virtue of the antagonistic action of insulin and adrenaline on sugar production in the liver, together with the action of insulin in promoting peripheral utilisation of sugar; Cori has stated that under some conditions adrenaline may also retard the peripheral utilisation of sugar. A fall of blood-sugar results in an increased secretion of adrenaline, which increases hepatic sugar secretion by stimulating the breakdown of liver-glycogen, so that the fall of blood-sugar level is arrested and the hypoglycæmia corrected. Alimentary hyperglycæmia, on the other hand, results in a decreased hepatic sugar secretion, and the liver may also assist in lowering the blood-sugar level by absorbing sugar from the inflowing blood, while there is an increased sugar uptake by the peripheral tissues with a marked increase in muscle-glycogen and a rise of R.Q. These effects, which can be elicited by insulin administration, all tend to lower the blood-sugar level, and as they are lacking in the depancreatised animal they are presumed to be associated with insulin secretion, although there is no definite evidence that *extra* insulin must be secreted during hyperglycæmia in order that the phenomena may be evoked in the liver. That the blood-sugar normally tends to return to about the same level after deflection in either direction indicates that all these various phenomena are controlled in such a manner that their effects of carbohydrate economy are balanced within only a narrow range of blood-sugar levels. At other levels the resultant of all these reactions is such that either sugar production in the liver or sugar utilisation in the peripheral tissues predominates.

Theories of Diabetes

In this discussion the metabolic derangement in diabetes will be considered rather than the nature of the cause of this derangement.

As first enunciated by Claude Bernard [4] there are two obvious possible causes of the diabetic condition: (1) excessive secretion of sugar by the liver; (2) inability of the extrahepatic tissues to absorb and utilise sugar. Bernard himself favoured the first possibility clinically because he had observed a case of diabetes mellitus complicated by cirrhosis of the liver, in which the diabetic condition was gradually alleviated and finally vanished as the cirrhosis progressed (p. 355).

Minkowski (1893) on the other hand strongly favoured the under-utilisation theory, but Pflüger (1905) believed that over-production of sugar was one cause, which idea was firmly supported by van Noorden (1910) whose name has become so closely associated with this theory. The over-production theory was severely criticised by Lusk and his school (1924) who believed that the completely depancreatised dog was quite incapable of burning sugar. Macleod and his school (1928) were not in agreement with these views however, but believed that the primary cause of diabetes was uncontrolled hepatic gluco-neogenesis—i.e., sugar production from non-carbohydrate sources—although decreased utilisation of glucose in the muscles might also be associated.

The theory of defective carbohydrate oxidation in pancreatic diabetes was mainly based on three important facts: (1) the non-protein R.Q. of diabetes is at a level which was supposed to preclude direct oxidation of carbohydrates; (2) administration of glucose resulted in no detectable rise in R.Q., and the sugar was almost quantitatively excreted in the urine; (3) the increase in the arteriovenous blood-sugar difference of the blood-supply to the muscles which normally follows sugar ingestion was diminished or completely lacking.

On the basis of these and other facts the over-production theory was forced to assume that fat could be converted to sugar in the body. If this conversion did occur then the R.Q. of diabetes, as we have already seen, was readily explicable as the average of the R.Q. of the conversion of fat to carbohydrate in the liver, and the R.Q. of the oxidation of the carbohydrate and other substances in the peripheral tissues. Likewise, if the organism was already being flooded with excessive amounts of sugar, so that sugar was being oxidised at the maximum necessary rate in the extrahepatic tissues, then it is not surprising that the addition of extra sugar to the body resulted in no extra sugar utilisation but in the quantitative excretion of the added carbohydrate.

The over-production theory's assumption of fat to carbohydrate conversion was at one time strengthened by the results of various investigations,

† Recent experiments of Lawrence (Brit. Med. Jour., April 11th, 1936) are not in agreement with this idea.

beginning with that of Meyerhof (1919), which all agreed that the R.Q. of muscle tissue, both at rest and exercising, was unity. The thesis was therefore developed that muscles could burn sugar only, and that during fasting, for instance, when the energy requirements were supplied largely by the oxidation of fat, the fat was converted into sugar, the latter being the actual fuel burnt in the muscles. As the muscles of the diabetic animal were capable of carrying out considerable amounts of work they were therefore capable of oxidising carbohydrate, and as the sugar excretion in severe diabetes was not influenced by muscular exertion, the sugar oxidised by the muscles must have been replaced by an increased production of sugar in the liver.

Although no definite statement can yet be made it seems extremely probable that mammalian muscle tissue can directly oxidise substances other than carbohydrate; one can at least say that the evidence for the proposition that carbohydrate only can be oxidised has gradually dwindled away, so that the assumption is no longer necessary. Nothing is known about the possibility of the conversion of fat to carbohydrate in the muscles themselves, the recorded R.Q.'s being, of course, unable to shed light on this question. It may well be that the idea first expressed by Krogh and Lindhard [5] and considered in a somewhat different light by Adams and Poulton [6] is correct—namely, there may be a constant carbohydrate-fat combustion ratio maintained in the muscular tissues, the necessary conversions occurring if an excessive amount of either carbohydrate or fat is available. We have previously assumed that the sugar absorbed by the extrahepatic tissues of the fasting normal dog amounts to 0·25 g. per kg. per hour; calculation shows that the oxygen required to oxidise sugar at this rate would amount to about a quarter of the total oxygen consumption of the whole animal, while even if all this carbohydrate were produced from fat in the liver then less than a half of the total oxygen could be accounted for. It therefore seems probable that the muscles of the fasting dog are oxidising material other than carbohydrate absorbed from the blood stream.

On the other hand it seems proved by the experiments of Mann, in which the blood-sugar level fell when a depancreatised dog was hepatectomised, that the tissues of the depancreatised dog are absorbing and oxidising sugar. Nevertheless the experiments of Markowitz and his colleagues [7] have shown that the sugar utilisation of the tissues of the depancreatised dog may be subnormal. It seems, therefore, that there is sufficient evidence that the type of over-production theory which demands the assumption that muscles oxidise nothing but carbohydrate absorbed from the blood stream is not correct, but equally well the under-utilisation theory which asserts that the tissues of the depancreatised dog are quite incapable of oxidising sugar is untrue.

A 10 kg. fasting depancreatised dog usually excretes about 10–15 g. of sugar each day; we can calculate, from the experiments of Markowitz and others quoted above, that its extrahepatic tissues are absorbing sugar at the rate of about 45 g. each day; its liver is therefore producing sugar at the rate of about 45 + 10–15 g. = 55–60 g. per diem, which is just about the amount of sugar which we have calculated to be secreted by the liver of the normal fasting 10 kg. dog each day; it is therefore not necessary to postulate over-production of sugar by the liver of the *fasting* depancreatised dog in order to account for its glycosuria. It must be remembered, however, that one postulate of the over-production theory has been accepted—viz., that sugar can be formed from fat, in order to account for the sugar production of the liver of the normal fasting dog.

As we have seen the normal liver reacts to hyperglycæmia by diminished sugar secretion, thus allowing the extra sugar in part, sometimes entirely, to be absorbed into the extrahepatic tissues in place of that which the liver would have liberated, while the rate of sugar absorption of these tissues is also much increased above the fasting level. As exogenous sugar is nearly quantitatively excreted by the depancreatised dog it appears that in this case the liver is incapable of responding to hyperglycæmia by a diminished sugar production, while the peripheral tissues are unable to absorb sugar at a rate greater than that in the fasting condition. Yater, Markowitz, and Cahoon [7] believe that although the sugar requirement of resting normal skeletal muscle is about the same as that of resting diabetic muscle, yet the contracting diabetic muscle, unlike normal muscle, cannot absorb extra glucose from the blood stream in order to satisfy the extra energy requirements. All these facts could be correlated, as far as the absorption of carbohydrate food is concerned, by assuming that the liver of the depancreatised dog is secreting sugar at the normal fasting rate of about 60 g. per diem, whether or not carbohydrate food is given, the tissues absorbing only about 45 g. of this sugar both when the muscles are in an active state or in a resting condition; the balance of the sugar secreted by the liver would be excreted together with any exogenous carbohydrate. This theory combines portions of both the original over-production and under-utilisation theories, in that the tissues of the diabetic animal are assumed to utilise somewhat less sugar than those of the normal animal, while the liver of the depancreatised dog which is receiving carbohydrate food is believed to be producing much more sugar than the body requires at this time; however there is no need, as we have seen, to assume that the liver of the fasting depancreatised dog is over-producing sugar.

A consideration of the reasons why exogenous protein food is converted to carbohydrate in the depancreatised dog necessitates a discussion of the question of wnich might be cause and which effect, the under-utilisation of the tissues, or the over-production of sugar in the liver. There is really no definite evidence on this point, but it is perhaps more reasonable to suppose that under-utilisation of sugar in the muscles would stimulate excessive sugar production in the liver rather than that excessive sugar secretion in the liver should result in under-utilisation of glucose in the peripheral tissues, although one cannot expect nature necessarily to be rational in the sense that we understand reason. If, however, the under-utilisation of sugar is primary then the conversion of protein to carbohydrate to the liver in response to stimuli from tissues unable to oxidise sufficient carbohydrate would be comprehensible, but such conversion would be expected equally well if the liver were in receipt of stimuli from another centre—e.g., the pituitary gland—which caused a general increase in sugar production in that organ, while the peripheral under-utilisation might also arise from a similar cause. This point will be discussed in the next lecture.

Since Minkowski's early experiments it has been generally assumed that human diabetes mellitus is due to a deficiency of pancreatic function, and the remarkable success of insulin in the treatment of this

condition seemed at one time to exclude any other possibility; that nevertheless this assumption may in part be unjustified will be mentioned in the next lecture.

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IV

ALTHOUGH an association between the pituitary gland and carbohydrate metabolism was long suspected on the basis of clinical observations it was not until 1929, when Houssay [1] and Biasotti found that hypophysectomy alleviated the symptoms of pancreatic diabetes in toads, that the extent of the association was suspected. This important result attracted curiously little attention at the time, and although Houssay later showed (1930) that hypophysectomy also alleviated, in a remarkable manner, the symptoms of diabetes in depancreatised dogs, it was not until 1933 that these striking experiments were independently confirmed and generally accepted. About the same time (1930) Burn and Ling showed that injection of an anterior pituitary extract into rats considerably increased an experimentally induced ketonuria, and the presence of a factor in the pituitary gland which could induce ketosis in normal animals was later demonstrated by Anselmino and Hoffmann (1931) and Magistris (1932). By this time the importance of the influence of the pituitary gland in carbohydrate metabolism was rapidly becoming apparent.

Influence of Hypophysectomy on Carbohydrate Metabolism of (*a*) Normal and (*b*) Depancreatised Animals

Normal Animals.—Hypophysectomy greatly increases the sensitivity of an animal to the effects of injected insulin, so that a very small dose may cause convulsions and death. Fasting, even for a short period, may cause a severe and often fatal hypoglycæmia in the absence of the pituitary gland, and although the hypoglycæmic symptoms may be relieved by glucose administration, early and prolonged treatment is necessary. In hypophysectomised dogs the hypoglycæmia of phlorrhizinisation (Biasotti and Houssay, 1932) or of fasting (Soskin and others [2]) may be alleviated by feeding carbohydrate or protein, although fat is ineffective. Soskin considers this to demonstrate that the pituitary gland stimulates the conversion of fat to sugar. Experimental hyperglycæmias are greatly diminished in intensity in hypophysectomised animals, adrenaline administration causing very little rise of blood-sugar even when ample stores of liver-glycogen are present (Cope and Marks [3]); in such animals the liver-glycogen appears to be resistant to the action of glycogenolytic stimuli, this being one cause of the increased sensitivity to insulin action. In general it appears that hypophysectomy depresses the ability of the liver to liberate sugar into the blood stream. In respects other than those mentioned the carbohydrate metabolism of hypophysectomised animals appears to be little different from that of normal controls.

Depancreatised Animals.—Alleviation of the symptoms of pancreatic diabetes induced by hypophysectomy has been demonstrated in dogs, cats, amphibians, reptiles, and fishes by numbers of different workers, so that there is no doubt about the widespread validity of Houssay's remarkable discovery. In this account the metabolism of the hypophysectomised-depancreatised dog, called for convenience the "Houssay dog," will be briefly discussed.

The glycosuria of the Houssay dog is very variable, ranging between 0·5 and 10 g. for a diet which induces the excretion of 50–70 g. of sugar per diem in an animal in which the pancreas alone is removed. Ketonuria is slight or non-existent and polyuria is generally absent. The blood-sugar level fluctuates over a wide range, a short fast resulting in a subnormal value, while after food a level of 300 mg. per 100 c.cm. may be attained; glycosuria is, however, usually confined to a short period following meals. It must be stressed that the general condition of the Houssay dog is far from normal, and that although it may live for as long as nine months without special treatment its weight steadily declines and death is inevitable. It lives precariously balanced between hypoglycæmia and diabetes; a comparatively short fast may induce fatal hypoglycæmia, whereas extensive carbohydrate feeding may aggravate the diabetic state. Like the hypophysectomised animal the Houssay dog is very sensitive to the hypoglycæmic action of insulin. Administration of sugar is followed by partial or even complete retention, according to the rate of administration, and the R.Q. rises, sometimes as much as in normal animals (Houssay). Liver- and muscle-glycogen levels are normal. It therefore appears that in the complete absence of insulin the Houssay dog is capable of utilising and oxidising carbohydrate. Those who believe that insulin is necessary for the utilisation of carbohydrate in the normal animal, so that the simple depancreatised dog is unable to oxidise carbohydrate at all, are forced to the conclusion that in the absence of the pancreas the pituitary gland is normally inhibiting sugar utilisation in the peripheral tissues, although these tissues autogenously utilise sugar if the pituitary is removed as well as the pancreas.

The tendency for hypoglycæmia to develop in the Houssay dog, as well as the hypersensitivity to insulin action, suggests the possibility that in this case, as in the simple hypophysectomised animal, the ability of the liver to liberate sugar into the blood is subnormal.

Diabetic Activity of Pituitary Extracts

Although the term "diabetogenic" has recently been used to describe extracts which induce a glycosuria without a ketonuria, the use of such a term in this sense is misleading, as the expression "diabetes" is associated with the exhibition of both glycosuria and ketonuria. In this lecture, therefore, the term "diabetogenic" will be reserved for a stimulus associated with the production of both glycosuria and ketonuria, while the term "ketogenic" will be used to describe that which stimulates the formation of ketone bodies without affecting the blood-sugar level.

In 1930 Houssay [1] and Biasotti found that implantation of pituitary tissue under the skin of hypophysectomised-depancreatised toads resulted in the production of an intensely diabetic condition; their demonstration that extracts of anterior, but not of posterior, pituitary gland were equally effective was the first clear distinction to be drawn between the relative importance of posterior and anterior lobes

in the metabolism of carbohydrate. They further showed that although the injection of anterior pituitary extracts could induce a diabetic condition in intact animals, no such effect followed injection of posterior lobe extracts, although the latter preparations caused a transitory rise of blood-sugar level. The assumption has therefore been made that the absence of the anterior lobe alone is of significance in those experiments in which the effects of removing the whole pituitary gland on the metabolism of carbohydrate have been studied.

That continued daily injections of crude anterior lobe extracts will induce a definitely diabetic condition in both intact and hypophysectomised-depancreatised animals has been confirmed by a number of workers, but a marked species variation in the response of intact animals has led to come confusion on the subject. Although intact cats and dogs may readily react to the diabetogenic action of crude extracts, rabbits, rats, and mice are relatively resistant. In the dog daily injections of an alkaline extract of fresh anterior pituitary lobe produces, on the third or fourth day of injection, a condition characterised by symptoms of diabetes: hyperglycæmia, glycosuria, ketonuria, acidosis, polydipsia, polyuria, &c. The R.Q. is low and, as in pancreatic diabetes, does not rise on sugar administration. In contrast to pancreatic diabetes, on the other hand, glycogen storage tends to increase rather than diminish, while the diabetic symptoms disappear if the animal is fasted. If the injection of extract is stopped the blood-sugar level falls and reaches a normal level in 1–3 days. I have found [4] that after five or six days of injection a dog becomes resistant to the diabetogenic action of a given dose of crude anterior lobe extract, although the symptoms reappear for a short time following each successive increase in the dose administered daily. Whether it is possible to inject a dose which is sufficiently large completely to overcome the animal's power of becoming resistant has not been determined with certainty.

Some confusion has been caused in this field by the failure of some investigators to draw a distinction between the non-specific action of many crude tissue extracts in causing a rise of blood-sugar immediately following injection, and a true diabetic action, which is seen only after two or three days' injections. Houssay finds that true diabetogenic effects can be obtained in the absence of most of the endocrine glands, although the presence of the liver is essential; the presence of the adrenal cortex may also be necessary (cf. Long and Lukens, 1935).

Influence of Pituitary Extracts on Sensitivity to Insulin Action

As was stated above, an increased sensitivity to the glycæmic action of insulin, and a decreased response to that of adrenaline, follows hypophysectomy. Cope and Marks [3] showed that injection of a saline suspension of anterior lobe tissue into rabbits was followed by a resistance to the action of insulin, and an increased sensitivity to the hyperglycæmic action of adrenaline. I have concentrated the factor responsible for these effects and have found that it is closely associated with the lactogenic hormone, with which it may conceivably be identical.[4] Partially purified preparations of the factor inducing insulin resistance are not diabetogenic (although a transient glycosuria may result from repeated daily injections), and their administration does not significantly affect the fasting blood-sugar level, while ketonuria is not induced. Marks [5] has recently shown that such preparations may partially inhibit the peripheral action of insulin in eviscerated cats, but it seems most probable that the resistance to the hypoglycæmic action of insulin induced by these preparations is associated mainly with an exaggerated sensitivity of the liver-glycogen towards the glycogenolytic action of the adrenaline secreted in response to the hypoglycæmia.

As yet there is no evidence as to whether the lactogenic hormone itself (prolactin) is responsible for the above effects, or whether these results are due to another factor or factors contaminating prolactin preparations but not accompanying preparations of other anterior hormones, which are ineffective in this respect. When one recalls, however, that the period of lactation is a time when hypoglycæmia may easily develop, the association of a factor stimulating lactation with one inducing an exaggerated glycæmic response to hypoglycæmia becomes of interest. Although it has been shown that prolonged thyroid feeding may induce an increased sensitivity to the hyperglycæmic action of adrenaline, it appears unlikely that the above effects are mediated by the thyroid gland because (*a*) thyreotropic hormone preparations from anterior pituitary tissue are ineffective under the conditions of these experiments; (*b*) the effects develop with comparative rapidity. For the purposes of convenience in this lecture the pituitary substance responsible for the rapid development of an exaggerated glycæmic response to hypoglycæmia will be called the "glycotropic factor" without prejudice to the question of its existence as a separate entity.

It was mentioned above that Marks has recently shown that glycotropic extracts may partially inhibit the peripheral action of insulin; Campos [6] and his colleagues have shown that the fall of blood-sugar and muscle-glycogen levels which normally follows hepatectomy in the toad is retarded by anterior lobe implants. Although these important observations at present lack confirmation, they indicate the possibility that, besides stimulating sugar production in the liver, pituitary extracts may also retard the peripheral utilisation of blood-sugar, an action strikingly in contrast to that of insulin.

That insulin resistance can be induced by extracts which leave the blood-sugar level unaffected renders improbable the idea that the anterior lobe secretes a simple anti-insulin, diabetogenic hormone; the preparation [5] of ketogenic extracts which do not raise the blood-sugar level is also not in keeping with a unipartite hormone theory. Collip [7] has recently suggested that the diabetogenic action of anterior pituitary extracts is due to the combined action of two substances, one acting on the blood-sugar level, and the other, the ketogenic factor producing ketosis, but it seems possible that more than two substances are concerned. There is evidence that the anterior lobe contains a factor which stimulates liver-glycogen formation (Chianca,[8] Magistris,[9] Houssay, 1935), an effect which may be associated with the ketogenic factor (Mágistris, 1933); the possibility that this factor stimulates glycogen formation from fat in the non-fasting animal may be considered. In this connexion it is interesting to note that Hertz [10] has called attention to a possible relationship between von Gierke's disease (characterised by a marked increase in glycogen content accompanied by ketonuria) and the pituitary gland. Anselmino and Hoffmann [11] have recently considered the possibility that the pituitary gland also secretes a glycogenolytic factor.

We therefore have evidence of the existence in the pituitary gland of the following factors: (1) a ketogenic factor, associated with, or possibly identical with, a factor stimulating liver-glycogen formation; (2) a glycotropic factor, facilitating hepatic glycogenolysis and inhibiting, to some extent, the peripheral action of insulin, but not itself causing hyperglycæmia; (3) a glycogenolytic factor. Any of these factors alone is not diabetogenic, but their combined action would result in increased sugar production in the liver, ketosis, and possibly a decreased peripheral utilisation of sugar, symptoms which we have previously associated with a diabetic condition. The possibility that the diabetogenic complex consists of three separate factors must therefore be considered.

Possible Rôle of Pituitary Gland in Ætiology of Diabetes

Consideration of the marked alleviation of the symptoms of pancreatic diabetes induced by hypophysectomy, and of the action of anterior lobe extracts, which in general is antagonistic to that of insulin, suggests the possibility that pancreatic diabetes may result from the uncontrolled action of the anterior pituitary gland, the action of the latter normally being balanced against that of insulin. This idea receives some support from the fact that the injection of œstrin, which is believed to repress the activity of the anterior hypophysis, alleviates to some extent the symptoms of diabetes in depancreatised dogs and monkeys (Barnes, Regan, and Nelson, 1933); on the other hand irradiation of the sella turcica by X rays is without effect in depancreatised dogs (Sella, Westra, and Johnson, 1935). Œstrin treatment has also been used successfully in some cases of diabetes mellitus (Mazer, Meranze, and Israel, 1935; Houssay, 1935), while in two cases of basophilism complicated by diabetes, the diabetic symptoms were markedly alleviated by pituitary irradiation (Cushing, 1932; Lawrence, 1934). Further investigation of the relationship between the hypophysis and diabetes will undoubtedly yield results of great interest.*

Collip (1935) has shown that what he terms "antihormones" may be formed in response to the prolonged administration of anterior lobe extracts; these antihormones inhibit the action of the injected hypophyseal factors. The existence of an "antidiabetogenic" hormone has not, however, been demonstrated unless indeed insulin should thus be described. It is perhaps not irrelevant to note that Anselmino and Hoffmann (1934) believe that anterior lobe extracts contain a "pancreatropic" hormone which stimulates islet formation in the pancreas.

Theories of Diabetes

The available evidence suggests that the pituitary gland stimulates the formation of sugar from protein (Houssay) and from fat (Soskin), and that the alleviation of diabetes following hypophysectomy is due in part to the diminution of sugar production from these sources. There is also some evidence that the pituitary can retard the peripheral utilisation of glucose. These effects are generally antagonistic to those of insulin, and it seems probable that the mechanism of mutual adjustment of sugar production in the liver and sugar utilisation in the peripheral tissues is associated with the balanced action of insulin and the pituitary factors, together with adrenaline. The case of the heart-beat is perhaps analogous; the heart has the intrinsic property of beating rhythmically, although the actual rate and type of beat is adjusted by the mutually antagonistic actions of the sympathetic and parasympathetic nervous systems. Similarly inherent processes of manufacture of sugar in the liver and utilisation in the peripheral tissues probably exist, these processes being intrinsic properties of the relevant tissues; the precise mutual adjustment of the rates of these two processes is effected by the endocrine system, the antagonistic actions of insulin and the pituitary factors playing an important part in this adjustment.

It is perhaps significant that in the diabetic condition caused by injection of pituitary extracts, fasting causes a disappearance of the diabetic symptoms; this observation is in agreement with the idea considered earlier that during fasting the liver is producing sugar at the maximum rate possible under the conditions obtaining; if this is so it is not surprising that added pituitary influence is relatively ineffective in this connexion. If, as was also considered possible, the liver of the fasting depancreatised dog is secreting sugar at the same rate as the normal fasting dog, then inhibition of peripheral utilisation of sugar under pituitary influence might be indicated by the fact that the fasting depancreatised dog excretes sugar.

In the third lecture, as a result of a discussion as to whether over-production or under-utilisation of sugar was primarily responsible for the condition of diabetes, it was considered possible that neither was primary, but that both these effects might be produced by a third factor. A survey of the influence of the pituitary gland on carbohydrate metabolism shows that this gland might fulfill the rôle of this hypothetical common stimulator of both over-production and under-utilisation of sugar. If both of these effects do occur in diabetes (at least in the non-fasting condition) but neither is primary, then agreement may be reached in an ancient controversy in a manner satisfactory to all concerned.

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* O. L. V. de Wesselow and W. J. Griffiths (THE LANCET, 1936, i., 991) have recently found that injection of plasma from a particular type of diabetic patient into a rabbit renders the animal's response to subsequently administered insulin extraordinarily similar to that found to follow injection of anterior lobe extracts. If, as seems possible, this type of diabetic patient corresponds to the "insulin insensitive" type of H. P. Himsworth (THE LANCET, 1936, i., 127), then the possibility that the latter type of diabetes is due to hypersecretion of a hypophyseal factor rather than to the lack of an insulin sensitising agent (Himsworth) must be considered.

THE NEW SURBITON HOSPITAL.—The Duchess of Gloucester officially opened the new hospital at Surbiton on July 28th. Lord Ashcombe, Lord Lieutenant of Surrey, in welcoming her, said that the hospital was one of those happily still existing in Surrey that were managed and supported by voluntary effort. The decision to build a new hospital on a new site had been justified by the response to the appeal, for £40,212 of the £55,000 required had already been obtained. The hospital was designed by Mr. Wallace Merchant, F.R.I.B.A.; it is a one-floor building in the modern style and contains 66 beds.

OPERATIVE TREATMENT OF SEVERE GASTRIC HÆMORRHAGE OF ULCER ORIGIN

A REPLY TO CRITICS

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In The Lancet of Oct. 19th, 1935 (p. 915), Dr. Letheby Tidy disputed the concluding statement of Mr. Gordon-Taylor's address, published in the preceding number (p. 815)—

> Finsterer's "first 48 hours" is still the optimum period for surgical attack in hæmatemesis, and the golden age of gastric surgery will have been attained only when all cases of hæmorrhage from chronic ulcer come to operation within that space of time—

and suggested that neither my statements nor my statistics could be safely accepted. However, in the following issue, Gordon-Taylor, W. F. Neil, Henry Wright, and Holmes Sellors defended the credibility of my statistics and restored my reputation for scientific integrity. Nevertheless I feel I must state clearly the reasons for the views I have held for the last 22 years on gastric hæmorrhages and correct some misquotations from my writings.

HISTORICAL NOTE

Twenty-two years ago, when an assistant at the Hochenegg Clinic, I operated on a man aged 26 on the fourth day of an acute gastric hæmorrhage, which had continued in spite of medical treatment and left him very anæmic. Operation under local anæsthesia revealed a duodenal ulcer penetrating the pancreas, the whole of the small intestine and colon being filled with blood. I did a pyloric exclusion by ligation and a posterior retrocolic gastro-enterostomy. The jejunal loop was filled with bright red blood. A large tampon was placed on the duodenum and used to compress the latter by means of a compression bandage applied after the abdomen had been closed. Death occurred ten hours after operation in spite of saline infusions, &c. Autopsy showed erosion of the pancreatico-duodenal artery at the base of the ulcer with fatal hæmorrhage into the bowel, but the jejunum was already free from blood.

This case convinced me of the necessity of surgical treatment in profuse acute gastric hæmorrhage, an opinion not then generally accepted, as it was held that the risk incurred in postponing the operation till the patient had partially recovered was less than that of immediate operation—a view still held by many physicians and some surgeons. The case also clearly suggests that success may be expected by operating before the severest stage of anæmia has been reached, especially with the aid of blood transfusion, not at that time available.

In 1918 I expressed the view, based on 18 cases, that better results could be obtained by operating on cases of severe acute hæmorrhage from chronic ulcers before the patient had almost bled to death. Later, after operating on a larger number of cases within the first 48 hours, I was able to reduce the mortality from 28 per cent. to 11 per cent. (up to 1931). In May, 1933, I illustrated the importance of immediate operation by an analysis of 46 cases of early operation and 55 cases of late operation in which the percentage mortality was 4·3 and 32·7 respectively. At the congress of French surgeons in 1933 I corrected several mistakes in the reports of Papin and Wilmoth which had occurred through faults in translation of my papers. I then pointed out that I had never claimed that 98 per cent. of all severe gastric hæmorrhages (including non-operated cases) were caused by chronic ulcer; nor that in 98 per cent. of all operated cases hæmorrhage was due to erosion of a large artery outside the stomach at the base of a penetrating ulcer.

PROGNOSIS WITH AND WITHOUT OPERATION

The contention that fatalities rarely occur in cases of severe gastric hæmorrhage is not in accordance with facts. Physicians who claim never to have had a death from acute gastric hæmorrhage must either have been so fortunate as to have treated none but hæmorrhages from superficial or non-penetrating chronic ulcers, or they have excluded from their statistics cases of bleeding from erosion of large arteries at the base of penetrating ulcers which were operated on later, because of continued hæmorrhage, without their knowledge or consent. The mortality of 2·5 per cent. under medical treatment refers to all cases of gastric hæmorrhage; even Tidy admits this. In operation cases the severest hæmorrhages only are considered. Miller (Philadelphia) gives the mortality as 3 per cent., but he includes all hæmorrhages, and in 22 per cent. of his cases carcinoma was present—and this, as is well known, seldom leads to severe bleeding. In 550 cases of gastric resection which I did for carcinoma there were only 3 cases of severe hæmorrhage.

The mortality from severe bleeding ulcers is considerably higher. Aitken found 11 per cent. mortality in all cases (including slight ones) at the London Hospital and in the more severe cases to 42·8 per cent. Bulmer (Birmingham) gives the percentage mortality for 1927 as 16 for men, 8 for women, together 10; in 1932 the figure for acute ulcers rose to 18 and for chronic to 15·2. Gordon-Taylor gives the mortality of a 1924–33 series of cases treated by medical measures at the Middlesex Hospital as 21 per cent. Ross (Melbourne) had a mortality of 58 per cent. in 45 severe cases treated medically. Chiesman's report is very interesting. He found, at St. Thomas's Hospital, in cases of acute hæmorrhage from ulcers a mortality of 25 per cent.—27 per cent. among 137 men and only 15·6 per cent. among 54 women. In 62 cases bleeding continued after 24 hours in spite of medical treatment and 46 died—a mortality of 74 per cent. In 45 of these cases a large eroded artery at the base of the ulcer was found at autopsy.

The mortality in medically treated cases depends primarily on the number of cases with erosion of a large artery. This is just the group of cases that Tidy admits requires surgical treatment, but they were evidently not recognised clinically as such. Gastric hæmorrhages are especially dangerous in elderly patients with arterio-sclerosis, as they rarely stop bleeding spontaneously. If bleeding in these cases lasts more than 24 hours, or recurs, the prognosis is very bad. Aitken reports that of 62 cases (11 over 60 years of age) which bled for over 24 hours, all died of hæmorrhage.

The difficulty of diagnosis of hæmorrhage from an ulcer is not so great as has often been contended. The mere fact that according to Bulmer 89 per cent. of acute gastric hæmorrhages are caused by ulcers, while only 4·5 per cent. are due to cirrhosis and 1·3 per cent. to carcinoma, is sufficient to make us emphasise the possibility of an ulcer in every case of hæmorrhage. In the majority of cases operated on

by me diagnosis was made from the characteristic history and repeated X ray examinations. In doubtful cases I advise exploration under local anæsthesia. By examination of the stomach wall with the ungloved finger (after gastrotomy) any chronic or penetrating ulcer, even in the duodenum, can be excluded with certainty. Thus in cases of hæmorrhage in cirrhosis of the liver, uncontrolled by blood transfusion, the presence of an ulcer as the possible cause of the bleeding can be ascertained.

It is obviously improper to say that the results of medical treatment are better than those treated surgically, when comparison is made between cases of completely different degrees of severity. Formerly operation was only done as a last resource in cases where severe bleeding recurred in spite of medical treatment. As immediate operation—i.e., without previous medical treatment—has only been carried out within the last few years we have few statistics at our disposal. Gordon-Taylor reports that from 1919 to 1934 he performed early operations almost exclusively with only 2 deaths in 22 cases—a mortality of 9 per cent.—and in a more recent series of 21 cases he had 3 deaths, 2 of which were late and almost hopeless cases. Oliani (Trieste) reports in 10 cases of immediate operation only 1 death (from pneumonia); whereas in 5 cases of late operation there were 2 deaths. With immediate operation in the first 48 hours, without previous medical treatment, I had 3 deaths in 59 cases—mortality 5 per cent. These comprised 7 gastro-enterostomies with 1 death and 52 resections with 2 deaths—mortality 3·8 per cent.

Tidy is mistaken if he believes I operate in every case of hæmorrhage from an ulcer however slight. When he quotes from Gordon-Taylor's address, "Any hæmorrhage from an ulcer is almost as urgent as perforation," he did not realise that Gordon-Taylor was referring to acute bleeding from a chronic ulcer. In profuse bleeding from an already proven chronic ulcer I operate as soon as possible, because I cannot tell whether the hæmorrhage is from the mucous membrane at the edge or from a large artery at the base of the ulcer. If the first violent bleeding is not caused by erosion of a large artery it may be arrested by medical treatment, but life is still in danger, for at any time before the patient has recovered from his anæmia hæmorrhage may recur and this time from erosion of a large artery. Since it is impossible to tell beforehand whether the bleeding from a chronic ulcer can be arrested or whether a second hæmorrhage may occur before the patient has begun to regain his strength, I always operate immediately, and thus in almost every case have dispensed with a blood transfusion.

As the results of late operation are bad I do not advise operation where there is a possibility that the hæmorrhage has ceased. In these cases even the definite arrest of hæmorrhage by ligation of the bleeding arteries cannot repair the damage to the parenchymatous organs caused by anæmia. Repeated blood transfusions might perhaps prevent death.

TECHNIQUE

The first and most essential thing is to ensure the arrest of the hæmorrhage. For the last eighteen years in cases of gastric ulcer I have used direct hæmostasis either by excision of the ulcer or by a typical resection; ligation of the contributory coronary arteries is unreliable on account of anastomoses. In all cases where the ulcer penetrates the pancreas the stomach is separated from the pancreas, the bleeding artery at the base of the ulcer ligated, and the stomach closed provisionally. Later, when the general condition of the patient allows it, a typical resection is performed.

With duodenal ulcers, when possible, I do the typical duodenum-stomach resection, first separating the duodenum from the base of the ulcer and then ligating the eroded blood-vessel. In those cases where operation can only be performed with great danger to life because of the extent of the ulcer (even in the absence of acute hæmorrhage) I do not do a resection for exclusion, because by this method compression of the excluded part of the stomach with a tampon might easily lead to insufficiency of the closing suture, and hæmostasis without simultaneous compression would be inadequate where the main trunk of the pancreatico-duodenal artery is eroded. In these cases I prefer compression of the duodenum by a superimposed tampon.

Success depends first on the duration of the hæmorrhage and the extent of the anæmia, and secondly on the anæsthetic used. Chloroform and deep ether anæsthesia must be avoided. A local anæsthetic is essential with, when absolutely necessary, a short nitrous oxide anæsthesia. I recommended this seventeen years ago and the justice of my advice has recently been emphasised by Gordon-Taylor. Even with local anæsthesia, however, care must be taken. I use almost exclusively a 1 : 400 novocain solution, being content with mesenteric anæsthesia. For splanchnic anæsthesia I employ 50 c.cm. of 1 : 400 novocain instead of the usual 70 c.cm. of 1 : 200 novocain. Morphia must be used with great caution, especially in late operation, for here even the usual dose is sufficient to paralyse the respiratory centre, already damaged by severe anæmia, and thus death may result from asphyxia. Morphia has long been used in the medical treatment of acute hæmorrhage to reduce the blood pressure and thus stop bleeding, and Bulmer has pointed out the poor results obtained. I have had two specially instructive cases which confirmed this. In post-operative treatment in cases of severe anæmia morphia must be avoided, even on the first night after the operation. Morphia quietens the cough reflex and favours the onset of pneumonia.

RESULTS

When immediate operation can be performed—i.e., at the onset of hæmorrhage or at latest after 24 to 48 hours—satisfactory results can be expected even in the severest cases, if hæmostasis is complete. Of 7 gastro-enterostomies, almost all before 1920, I lost only one case where bleeding continued in spite of gastro-enterostomy. A resection was not allowed at that time. Autopsy revealed erosion of two large pancreatic arteries. Since 1920 in such cases I do the typical resection.

By immediate operation we can prevent not only death from hæmorrhage but also perforation. This latter always makes the prognosis particularly bad. It may occur at any time, in spite of medical treatment, when the ulcer is on the anterior wall. I have seen 4 cases of perforation complicating acute hæmorrhage. One case not sent for operation till nine hours after perforation had occurred died twenty-four hours after operation. The other three were cases of late operation for hæmorrhage and were operated on almost immediately after perforation. Two died of general peritonitis, while the third was cured.

The results of late operation for hæmorrhage are bad: 16 deaths in 53 resections—a mortality of 30 per cent. Even subtracting 6 cases in which the cause

of death had no connexion with hæmorrhage or the operation the mortality is still 20 per cent. In 6 cases anæmia was the sole cause of death, and in all of these there was erosion of a large artery at the base of a penetrating ulcer; 5 cases were operated on before 1924 when blood transfusion was first introduced. It is questionable whether the serious damage to the parenchymatous organs caused by anæmia could have been repaired by blood transfusion; for in the sixth case, operated on a year ago, three blood transfusions were unavailing. In spite of the bad results of late operation I have never refused to operate in a single instance, where medical treatment failed, no matter how bad the condition of the patient. In such cases the general condition may be improved sufficiently to render operation possible by previous blood transfusion or by continuous drip infusion of citrated blood.

It is necessary to discriminate between acute profuse gastric hæmorrhage and those cases of recurrent slight hæmorrhage causing severe secondary anæmia. The absolute indication for operation in such cases has been generally accepted since the time of Krönlein and Mikulicz. These cases of severe anæmia are much rarer to-day because patients are operated on earlier. I have had 51 such cases in which bleeding had lasted for weeks with a hæmoglobin percentage of 20 to 30 and 1·5 to 2·5 million erythrocytes. Before the war in these cases I performed gastro-enterostomy. Of 5 cases one was a woman aged 43, operated on in 1911 who died eight days later of severe hæmorrhage. Autopsy revealed erosion of the splenic artery at the bottom of an ulcer penetrating the pancreas. In 44 cases of resection there were 2 deaths—mortality of 4·5 per cent. In 2 cases of unresectable duodenal ulcers with severe anæmia, resection for exclusion was performed and a permanent cure resulted. Operation for secondary anæmia in elderly patients also gives good results provided general anæsthesia is not used. I have brought about a cure by operation in 10 cases between 60 and 74 years of age, using gastro-enterostomy twice and a typical gastric resection in the other 8.

I believe these remarkably good results of operation for acute hæmorrhage were only obtained because local anæsthesia was invariably used. For anyone who is unfamiliar with the enormous advantages of local anæsthesia these results must seem almost impossible, and this may explain the doubt as to the correctness of my figures. It can be readily seen from my report that I have never attempted to embellish my statistics by omitting the fatal cases which may possibly have no direct connexion with the hæmorrhage. I have reported all cases in which death occurred (in both early and late operations), stating the cause, in order that physicians who are the first to see patients with gastric hæmorrhage may be convinced that, in acute hæmorrhage from a chronic ulcer, immediate operation can prevent death from hæmorrhage or perforation and, given proper technique, is more likely than medical treatment to lead to recovery.

DUDLEY GUEST HOSPITAL.—The building extensions at this hospital are making good progress. The adolescent ward, modern theatre suite, and new X ray and massage departments are nearly finished. A further ward unit is in course of erection, and it is hoped to begin shortly on the administration block. Workpeople's contributions for 1935 were £8435, an increase of £772 over the previous year.

THE LOCATION OF CEREBRAL TUMOURS BY ELECTRO-ENCEPHALOGRAPHY

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Berger in 1929 was the first to show that the electrical activity of the human brain could be detected from the outside of the skull.[1] He called the record of this activity—obtained with a galvanometer or amplifier and oscillograph—the Elektrenkephalogram, abbreviated as "EEG" by analogy with the electrocardiogram—ECG. In English-speaking countries the term has come to be "electro-encephalogram." Berger[2] has renounced and condemned the name "Berger rhythm" which is still sometimes used for the phenomenon.

The most prominent feature of the normal human EEG is what Berger called "α waves." These have an amplitude of from 10 to 100 microvolts and a frequency of about 10 Herz (10 cycles per sec.). Their exact frequency varies in different individuals, but is remarkably constant in any given individual. They are nearly sinusoidal and usually come and go at irregular intervals (Fig. 1). Berger regards them as being in some complex way connected with the activity of the whole cortex. Adrian and Yamagiwa,[3] however, have presented very good evidence that the α waves normally originate only in the occipital lobes near the Area 19 of Vogt, and that they are inhibited by visual or intense mental activity. They are really most likely, therefore, to be indicative of a state of physiological rest in an area of the cortex associated with one function.

Berger also described faster "β waves." These are not seen as regularly as the α waves and their origin and significance are doubtful. They appear to arise somewhere in the frontal lobes of some subjects (see Fig. 4 a).

As regards pathological conditions, Berger himself has made several interesting observations on epilepsy [4] and anæsthesia.[5] Gibbs, Davis, and Lennox [6] have also shown how the EEG may be profoundly affected by anæsthesia and by some types of epileptic attack. It is not proposed to go into the contents of these and the other similar publications which have appeared from time to time, since their clinical importance cannot yet be assessed. It is satisfactory, nevertheless, to note that, at least, an abnormal state of the brain is associated with abnormal EEG's.

THE PRESENT INVESTIGATION

In the course of work at the Central Pathological Laboratory on other aspects of electro-encephalography, Dr. F. L. Golla, the director, suggested that records be taken from a case of suspected cerebral tumour. These records were so far from normal (Fig. 2) that it was decided to continue on this line of study. Through the courtesy of the staff of the Hospital for Epilepsy and Paralysis, Maida Vale, it has been possible to take EEG's from seven cases of intracranial tumour.

Three independent amplifiers were used with a triple cathode-ray tube unit; the amplifiers were home-made but the tube-unit and its power equipment were specially

designed and built by Standard Telephones and Cables. The input stages are modified push-pull units similar to the type described by Matthews.[7] This arrangement not only eliminates intercoupling between the amplifiers, but greatly reduces electrical interference, so that satisfactory records may be obtained from a patient

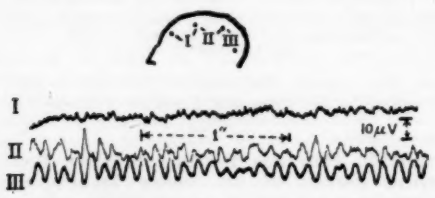

FIG. 1.—An example of a left EEG from a normal subject. Lead I. shows traces of β waves, leads II. and III. α waves moving over the parieto-occipital region. The subject's eyes were closed.

on the operating table without any screening. The amplifiers are resistance-capacity-coupled and battery-driven, but the power for the oscillographs and their associated circuits is obtained from the mains. The oscillograph screens may be observed and photographed at the same time. The maximum overall potential

FIG. 2.—The first record taken from a patient with a cerebral tumour. Note the slow waves from an area which normally shows only the fast β waves.

amplification is of the order of 5×10^7, and the maximum overall time constant is 2 sec. Silver-silver chloride pad electrodes were used for the skull leads, held on by a Butywave cap and moistened with saline. For leading off from the exposed brain during operations, sterilised silver-silver chloride wick electrodes were used, filled with sterile normal saline, and supported by an adapted Bestlite reading lamp.

The following results have been obtained:—

1. Records have been taken (*a*) leading from the skull just before operations, and (*b*) leading from the exposed brain beneath the same point during operations (Fig. 3). This has been done in both general and local anæsthetic cases. In all cases we have found that records obtained from the skull leads closely resemble those obtained directly from the underlying brain, except in regard to the size of the potential changes, which are attenuated by the skull. The potential changes recorded with the direct leads are of the order of 1 to 10 millivolts, those with the skull leads, 10 to 100 microvolts. It may be said, therefore, that records obtained from the skull are fairly faithful miniature copies of the electrical events in the brain below, except that, as Tönnies[8] has pointed out, the "spread" of the potentials is increased by the complex resistance network of the dura, skull, and scalp.

2. Under a local anæsthetic the potential changes from all but the occipital lobes are mostly irregular, but occasional rhythms can be detected (Fig. 3 i). In one case it was possible to lead directly from a subcortial glioma. As Foerster and Altenburger[9] found, the tumour is much less active electrically than the comparatively normal tissue around it. Probably many of the irregular "base line fluctuations" in skull leads are really due to electrical changes in the brain.

3. Under a general anæsthetic, particularly with ether, rather less with nitrous oxide, very large, often rhythmic potential changes are found (Fig. 3 ii). These involve the whole cortex and may appear at any point on the surface, travel a short distance and subside, to be succeeded by fresh disturbances. When regular, these waves have a frequency of from 3 to 4 per sec. and as lead from the skull an amplitude of up to 100 μV.

4. Similar large quasi-regular disturbances involving the whole cranium are found in cases of raised intracranial pressure (see Fig. 7). When the pressure is relieved by intravenous hypertonic solutions or other osmotic means, these disturbances subside. These "pressure waves" are distinguishable from the "anæsthetic waves" though they are very similar. It is probable that they are the result not merely or only of the raised pressure, but of the secondary changes which accompany it.

5. In cases of intracranial tumour in which the cerebral cortex was affected by invasion or by proximity, and where the pressure was still moderate or had been reduced, slow potential waves (of the order of 10 to 20 microvolts in size and occurring at the rate of 2 to 3 per sec.) have been led off from the skull immediately over the place where the tumour was subsequently found at operation or autopsy. Since this finding may turn out to be of clinical interest, the relevant cases will be summarised.

SUMMARY OF CASES

CASE 1. (Examined with single recorder only.)—A man, aged 48, under the care of Dr. Russell Brain. Left EEG: normal in all areas (Fig. 4 a). Right EEG: frontal, normal but for few slow waves posteriorly; parietal, few slow waves anteriorly; temporal, slow waves anteriorly (Fig. 4 b); occipital, normal. By moving the electrodes about over the temporal region it was possible by "presence or absence" observation to delimit the area over which the slow waves could be found. This was a point

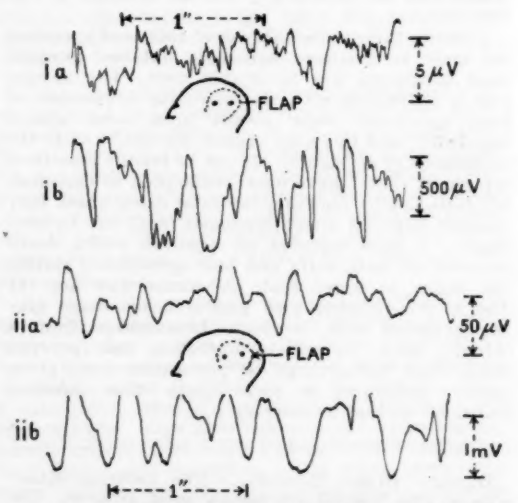

FIG. 3.—(i) Patient A. Man aged 48. (*a*) From the skull with high amplification. (*b*) During operation. From the corresponding area on the cortex with much lower amplication. There was only a local anæsthetic and morphine, and the eyes were closed in both records.
(ii) Patient B. Man aged 55. (*a*) From the skull. (*b*) From the underlying brain at operation, both when the patient was under nitrous oxide and ether.

about 2 cm. square, its centre being 5 cm. behind the posterior border of the right orbit.

Clinical Notes.—The patient was of good physique, left-handed, and complained of Jacksonian fits involving the left side of the mouth and left hand, occasional headaches, and slight motor aphasia. There was early papilloedema on the right side. There were no conclusive signs of pyramidal involvement. An encephalography was done, but the picture was poor. The patient developed a severe headache and relapsed into a stupor with a left hemiparesis. A ventriculography was then done. No air entered the right side, and the left ventricle was seen to be displaced to the left. The patient collapsed into a coma. The ventricles were tapped and shortly afterwards an emergency right temporal decompression was done. Death followed a few days later.

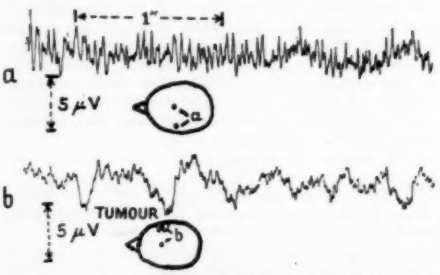

FIG. 4.—(Case 1.) The first case in which the tumour was located by electro-encephalography. (*a*) From the left side, showing almost continuous β waves at a frequency of about 25 per sec. (*b*) From the right side, showing the slow δ waves and smaller and less regular β waves.

At the post-mortem a large glioblastomatous tumour was found projecting to the surface at the junction of the main stem of the Sylvian fissure with its horizontal limb. The slow waves in the right EEG had been traced to a part of the skull over this point.

CASE 2. (Examined with triple recorder.)—A man, aged 51. Under the care of Dr. D. McAlpine.

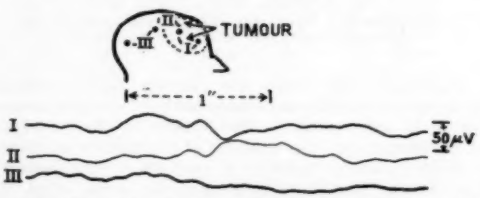

FIG. 5.—(Case 2.) Taken with the triple recorder. The amplification had to be kept low because the patient was liable to move. The varying phase-relations of the δ waves in leads I. and II. suggested that the area enclosed by the dotted line was abnormal. This was verified by numerous records taken with other electrode arrangements.

Left EEG: normal. Right EEG: frontal, slow waves; temporal, few slow waves; parietal, few small slow waves (Fig. 5); occipital, normal (although no α waves, probably on account of the patient's agitated state). Observation of the phase relations of the slow waves indicated that the disturbance involved nearly the whole of the right frontal lobe.

Clinical Notes.—There was an old history of trauma followed by coma and convulsions and general signs of "cerebral irritation." Later, the patient had improved, but had then started to complain of frontal headache and drowsiness. There was some sensory loss on the left side, where also the reflexes were exaggerated and the plantar reflex was extensor. A ventriculography was done, 5 c.cm. of air being introduced into the right side and 15 c.cm. into the left. The ventricular system was found to be displaced to the left. At operation a tumour was felt in the right frontal lobe. Parts of it were removed, but the patient died soon after.

Post-mortem examination showed a large astrocytoma involving the whole right frontal lobe. This confirmed the electro-encephalographic diagnosis.

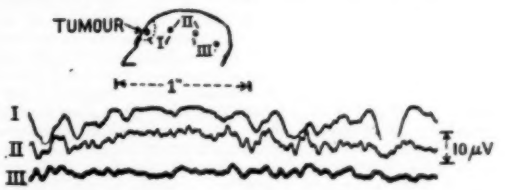

FIG. 6.—(Case 3.) The δ waves originate in the extreme frontal region. The area was further delimited by recording with more elaborate electrode patterns.

CASE 3.—A woman, aged 56. Under the care of Dr. W. G. Wyllie. Left EEG: frontal, slow waves from an area on the forehead extending from a point just on the right of the midline and 4 cm. above the nasion across to a point 5 cm. above the outer border of the left orbit (Fig. 6). Left parietal, temporal, and occipital EEG's were normal (Fig. 6). Right EEG: frontal, some slow waves from the forehead near the midline; parietal, temporal, and occipital, normal.

Clinical Notes.—A history of frequent falls, giddiness, headache, and some deterioration in speech, handwriting, and mental processes. There was also some obstinacy and sulkiness. The patient had just passed the menopause. There was definite early bilateral papilloedema, and there were a few motor signs on the right side. Radiography of the skull showed a peculiar opacity in the left frontal region. Ventriculography showed displacement of the ventricles to the right. At operation a tumour was found extending 4 to 5 cm. into the left frontal pole and displacing the frontal lobe across the midline. The greater part of this tumour, together with a part of the frontal lobe, were successfully removed.

The patient is still alive and progressing satisfactorily. In this case also the EEG location coincided exactly with the operative findings.

CASE 4.—A man, aged 21. Under the care of Dr. Golla. This patient showed symptoms of very high intracranial pressure on admission. The EEG in this condition showed slow waves over the whole skull (Fig 7 a). After reduction of the pressure by intravenous hypertonic saline the left front

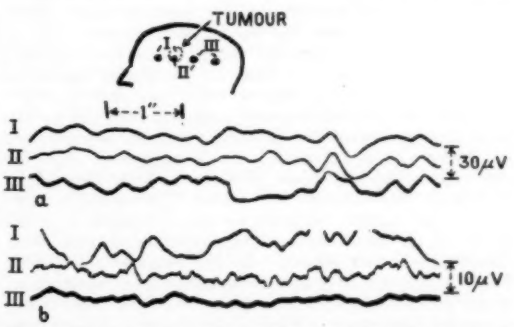

FIG. 7.—(Case 4.) (*a*) Taken while the intracranial pressure was high. The slow waves involve the whole cranium. No location is possible. (*b*) Taken with same electrode arrangement but after some reduction in the intracranial pressure. The slow waves are now restricted to the area of the tumour. The amplification in (*b*) is about three times that in (*a*).

temporal EEG's showed slow waves, the parietal and occipital being normal (Fig. 7 b). The whole of the right side was normal, except for occasional slow waves. The area giving rise to the slow waves on the left side was narrowed down to a patch 3 to 4 cm. in diameter about 1 cm. in front of and 5 cm. above the external auditory meatus.

Clinical Notes.—There was a history of Jacksonian epilepsy for 15 months as a result of, or following, an accident. The fits consisted of a numbness creeping from the face to the arm and foot on the right side, accompanied by twitchings starting in the right leg and marching to the right face and arm. More recently there had been persistent headache with projectile vomiting, aphasia, and some mental change. Deep reflexes were augmented in the right leg, and there was astereognosis and loss of two-point discrimination on that side. Recognition of objects was moderate, and in standing or walking the patient fell to the right. After reduction of pressure there was some improvement in two-point discrimination and in gait and posture. Ventriculography showed marked displacement of both ventricles to the right.

At operation a deep tumour was felt on the left side under the posterior part of the frontal and the anterior part of the parietal lobe. Seventy cubic centimetres of fluid was withdrawn from the deep cyst which had formed. A small patch of œdematous and hyperæmic cortex was seen where the tumour presumably came nearest to the surface. This patch was directly under the area mapped out on the skull by electro-encephalography. No attempt was made to remove the tumour, and at the time of writing the patient was still alive.

CASE 5. *An example of a negative case.*—A man, aged 58, under the care of Dr. A. Feiling. All EEG's normal. There was a history of Jacksonian epilepsy following a skull injury. The attacks involved the same side as the injury, so a contralateral tumour or a contre-coup was suspected. At operation a large area of atrophic cortex was found in the left pre-Rolandic area. This was drained; no neoplasm was seen. The patient was discharged improved.

Three cases of hemiplegia of vascular origin failed to show any abnormality in the EEG over the area of the lesion.

COMMENT

Comparison of the above cases with three (two cerebellar, one eighth nerve) in which the tumour was deep or below the tentorium and no local slow waves were found, indicates that location by study of the slow waves is possible only when the tumour involves or in some way affects the cortex itself. As yet it is not possible to say with certainty what tissue is responsible for the "slow waves." It is probably not the tumour itself, since leads placed directly on a tumour show no particular electrical activity. The similarity to the "pressure waves" and the "anæsthesia waves" suggests that the potentials are generated by cortical tissue in some phase of functional disturbance. It is suggested that for the sake of brevity these slow waves from the neighbourhood of tumours be called "δ waves" until their true nature be discovered. There is a possibility that the δ waves have some connexion with the evidences of pressure in the cortical area overlying a tumour and the disturbance of function and nutrition with which this state must be associated. Perhaps the most striking difference between the normal α waves and the δ waves is that the latter are in no way affected by sensory stimulation or mental activity. Unlike the α waves, therefore, they are not symptomatic of physiological rest.

It should be emphasised that although the region of new growth has been located in the four cases attempted where it has been in or near the cortex, and no non-existent tumours have been "located," this method can never be anything but supplementary to the clinical and skiagraphic techniques, and is probably as liable to error as they are in some circumstances. The absence of a complete theoretical foundation means, of course, that whatever claims can be made at this stage rest directly upon the evidence of the above cases.

This work was done under the supervision and with the encouragement of Dr. Golla. I should also like to express my gratitude to Dr. Sophia Graham for her frequent help and advice, particularly with some of the less interesting parts of the work; to Mr. Dickson Wright, Mr. Wylie McKissock, and Mr. G. H. Macnab for their interest and assistance, especially during their operations; to Dr. L. H. Morris for his help with the observations on anæsthesia; and to Dr. S. Nevin, who has most kindly given me indispensable information and instruction in pathology. I deeply appreciate the kind help given by the medical officers, physicians, matron, and nursing staff of the Maida Vale Hospital.

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DECREASED GONADOTROPIC HORMONE PRODUCTION DURING PREGNANCY

ASSOCIATED WITH INCREASED INTRACRANIAL PRESSURE

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CLINICAL experience has shown that pituitary tumours are usually associated with sexual dysfunction which is manifested in the female by the cessation of menstruation. An analysis of the menstrual abnormalities in a large number of such cases (Henderson [1]) has shown that these abnormalities occur when the pituitary gland has been mechanically compressed by the expanding tumour. Moreover, such effects on menstruation may also be brought about when the compression of the pituitary is secondary to an increase in the general intracranial pressure, which may result from any intracranial tumour or from simple obstructive hydrocephalus. It appears likely therefore that the sexual dysfunction results from an interference with the secretion of the anterior pituitary due to mechanical compression of its glandular tissue. In addition to these effects in the adult, it is well known that compression of the pituitary by hydrocephalus during pre-adolescence may delay the appearance of puberty for a considerable time or even indefinitely.

The pituitary is essential for the maintenance of ovarian function, for ovulation, and for the implantation of the fertilised ovum in all species that have been investigated. The relationship of the further course of pregnancy to the pituitary activity, however,

varies in different animals. In some species, removal of the pituitary after certain stages of pregnancy does not interfere in any way with the subsequent course of gestation; in others, its continued activity is essential throughout the duration of the pregnancy. In the human subject there is no evidence as to whether the pituitary is essential for the maintenance of pregnancy or not.

The present case is of interest in that symptoms and signs of intracranial pressure were present, which, in the absence of pregnancy, would have been associated with marked interference with the menstrual function due to a decrease in the pituitary secretion. The more acute symptoms appeared about the time of conception and yet gestation continued until artificially terminated at the sixth month.

CASE RECORD AND INVESTIGATION

Mrs. A. B., aged 33, was admitted to the National Hospital on March 18th, 1935, under the care of Dr. C. P. Symonds, with the complaint of severe headache and failing vision. For 18 months she had had morning headaches, frequently accompanied by vomiting, and for 8 months progressive unsteadiness in walking. Shortly before admission the headaches became more severe and were associated with failing vision and diplopia.

Examination showed marked papillœdema in both eyes; visual acuity 6/60 in the right eye and 6/18 in the left eye; marked nystagmus, especially to the right; diminished right corneal reflex; right external rectus palsy and diplopia; generalised hypotonia and decreased tendon reflexes; slight ataxia of the right arm and a pathological Babinski response on the left. Lumbar puncture showed a cerebro-spinal fluid pressure of 300 + mm.; and the fluid contained 2 cells per c.mm. and 380 mg. total protein per 100 c.cm.

At operation on April 18th the cerebellum was explored but no tumour or other cause for the increased intracranial pressure was found. This remained very high in spite of the cerebellar decompression which was bulging and very tense; there was frequent morning vomiting, and, as a result of the unrelieved pressure, the patient became blind from secondary optic atrophy with persisting papillœdema. Ventriculography showed marked hydrocephalus with symmetrical distension of the lateral and third ventricles.

The patient had been married for 13 years and had three healthy children. Menstruation had been regular until the last period in February, 1935. The absence of menstruation after her admission to hospital was attributed to the high intracranial pressure. The possibility of pregnancy was first suspected on July 1st when the uterus was found to be enlarged up to about 3 in. above the symphysis pubis. On August 7th the uterus was up to the umbilicus, the breasts had become larger and active, and a little secretion could be expressed from the nipples. An Aschheim-Zondek test on August 25th gave a "weak positive" reaction (Edinburgh Pregnancy Diagnosis Station). Fœtal movements were detected on August 26th.

It was decided, in view of the cerebral condition, to terminate the pregnancy prematurely. This proved to be unusually difficult. The membranes were ruptured on Sept. 4th, but this, and all subsequent medical methods, including two full inductions with quinine and pituitrin and a saline infusion containing 10 units of pituitrin per pint, failed to produce any uterine contraction; the uterus was quite definitely inactive to pituitrin. Finally, Willett's forceps were applied to the head and delivery was effected on Sept. 17th after light traction for 24 hours. The child was born alive and was normally developed, but it lived for only a few minutes. It weighed 2 lb. 8 oz. The period of gestation was estimated at the twenty-sixth week. The placenta weighed 230 grammes; it was not adherent nor otherwise abnormal. Specimens of urine taken on Sept. 1st, 15th, and 17th were examined quantitatively for gonadotropic hormone. The placenta was also examined.

The puerperium was quite normal. After the termination of the pregnancy the intracranial pressure remained very high, as shown by the continued papillœdema of at least 3 dioptres, the persistently tense decompression, and a cerebro-spinal fluid pressure of 300 + mm. when measured during repeated lumbar punctures. When the patient was last seen on March 15th, 1936, there was no significant change in her clinical condition, and there had been no return of menstruation.

GONADOTROPIC HORMONE EXAMINATIONS

The 24-hour specimen of urine taken on Sept. 1st (1380 c.cm.) was concentrated in vacuo at a temperature below 40° C. to one-tenth of its volume. An equal volume of alcohol was added and the precipitate centrifuged off and discarded; alcohol was added to the supernatant fluid to make the concentration 80 per cent. The precipitate was centrifuged off, extracted with ether, and dried in a desiccator (3·72 g.). 0·037 g. dissolved in saline and injected intravenously into a mature œstrus rabbit produced no effect on the ovaries; 0·125 g. similarly injected into another œstrus rabbit also produced no effect on the ovaries. Hence this specimen contained less than 1 rabbit unit in 46 c.cm. of urine, or less than 30 rabbit units were excreted in the 24 hours.

Part of the specimen collected on Sept. 15th was precipitated with alcohol without previous concentration; 0·167 g. of precipitate was obtained from 230 c.cm. of urine. 0·073 g., dissolved in saline, was injected intravenously into a mature œstrous rabbit and produced no effect on the ovaries. Hence this specimen contained less than 10 rabbit units per litre of urine.

Part of the specimen (150 c.cm.) collected on Sept. 17th was also precipitated with alcohol without previous concentration, and all the precipitate was injected intravenously into a mature œstrous rabbit. No effect was produced on the ovaries. This specimen thus also contained less than 10 rabbit units per litre.

Part of the placenta (50 g.) was dried in acetone (6·8 g. dried tissue) and then extracted with aqueous pyridine (Fevold, Hisaw, and Leonard [2]). The extract was made up to 25 c.cm. with saline and assayed on immature mice; each mouse received six injections on the morning and evening of three consecutive days and was killed on the morning of the fifth day after the first injection. All mice injected with a total of 3·0 c.cm. of the above extract showed blood spots in the ovaries. Five immature mice were injected with a total of 0·6 c.cm. of the extract: only one blood spot was produced in the ten ovaries, follicular maturation was produced in three animals, and the uterus was enlarged in all five animals. This amount (0·6 c.cm.) is thus about the minimum luteinising unit and a calculation shows that the placenta contained not more than one mouse unit in 1·2 g. of the original tissue.

DISCUSSION

The case described is of interest chiefly because it has afforded an opportunity of investigating the gonadotropic hormone production under the exceptional circumstances of pituitary hypofunction during gestation, and of comparing this production with that occurring during normal pregnancy.

The examination of three separate specimens of urine consistently showed a low content of gonadotropic hormone. In two of the three specimens less than 10 rabbit ovulating units were present per litre of urine, whereas in normal pregnancy a positive Friedman reaction is usually obtained with 5 c.cm. of urine or less (Wilson and Corner [3]). Moreover, the injection of an alcoholic precipitate from 30 c.cm. of urine, prepared as in the present determinations, normally gives a positive result even in immature rabbits (Robson [4]). The occurrence of a weak positive Aschheim-Zondek reaction also supports the conclusion that the urinary gonadotropic excretion was below normal. The results of the placental examination are in keeping with those obtained on the urine, as not more than 200 mouse units of gonadotropic hormone were recovered from it. The normal placenta at about the twenty-sixth week of pregnancy contains approximately ten times that amount (Zondek [5]). Stern [6] has reported a case of

pregnancy occurring after an operation for the partial removal of a pituitary tumour in which the urinary examination also showed a decrease in the gonadotropic hormone concentration, and a similar case has been described by Reckmann.[7]

Can any conclusion be drawn regarding the rôle of the pituitary during pregnancy in the human subject? Information is especially desirable on two points: first, whether the pituitary is essential for the maintenance of pregnancy; and secondly, what part it plays in the excessive production of the gonadotropic hormone. It is well known that when the signs and symptoms observed in this case are seen in non-pregnant patients they are usually associated with a marked decrease in the pituitary secretion, as can be inferred from the occurrence of amenorrhœa. It appears likely, therefore, that in the present case too there was interference with the hypophyseal secretory activity, though, in view of the existence of pregnancy, the amenorrhœa cannot be regarded as proof of this. Hence it appears possible that the pituitary is not an essential factor in the maintenance of pregnancy, and that in this respect the human subject resembles such animals as the rat, the mouse, and the guinea-pig, in which removal of the pituitary during the later stages of gestation does not necessarily lead to its premature termination. On the other hand, the evidence of decreased hormone production, derived from the quantitative estimation of the urine and placenta, does suggest that the pituitary is at least partly responsible for the enormously increased gonadotropic hormone production during pregnancy. These suggestions are purely tentative and are made in the hope that further data may be collected from similar cases of pregnancy associated with pituitary deficiency.

We desire to thank Dr. C. P. Symonds for permission to publish this case, and Dr. A. J. Wrigley who supervised the termination of the pregnancy. The expenses of this investigation have been defrayed by a grant from the Medical Research Council.

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ALLERGIC REACTIONS TO THE SCHICK TEST

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THE general features of allergic reactions are well known, and may include œdema of the face and other parts of the body, rashes of various types, usually urticarial, circulatory disturbance leading to collapse, dyspnœa, vomiting, diarrhœa, and slight pyrexia. These symptoms may be mild or severe, and develop within minutes, rarely hours, of an injection ("acute anaphylaxis"), or be delayed for some days ("serum sickness"). Fortunately the more severe types, with rapid onset, are extremely rare (approximately 1 in 100,000 cases where serum has been injected).

It is not generally recognised that so trifling a procedure as a Schick test may be followed by some degree of allergic manifestations. I have been able to trace reports of seven cases in the literature—viz., two recorded by Monroe, Volk, and Park (1934), one by Volk (1935), one by Shiffrin (quoted by Volk, 1935), and two by Freedman (1935) in America; one by Massey and Gilmore (1934) in England. I have also notes of seven others, of which three have occurred in connexion with my own work. None of these cases was fatal.

The available data of the fourteen cases may be summarised as follows:—

Age.—Four of the cases were adults, and the others children, aged 11 months to 15 years.

Allergic diathesis.—Two adults had reacted severely on a former occasion to the intradermal injection of Witte peptone. Two infants, aged 11 and 12 months, had had eczema. In none of the patients was there a history of asthma or hay-fever.

Previous injections of foreign proteins.—Four of the patients who were allergic to the Schick test had received immunising injections of diphtheria prophylactic, formol toxoid; three had had alum-precipitated toxoid and one toxoid-antitoxin mixture. Of the remaining six, three had had diphtheria antitoxic serum, and two were known to be sensitive to Witte peptone injected intradermally. It is not known whether the last subject of the series had received any injections previously.

The intervals between the last injection of prophylactic or serum and the Schick test causing the allergic reaction ranged from five weeks to three and a half years.

Two of my patients had suffered from diphtheria, and had had diphtheria antitoxin two and two and a half years previously; the third had received 1 c.cm. of alum-precipitated toxoid two months before the Schick test.

Symptoms.—In most cases symptoms appeared within a few minutes of the Schick test—in one case after 14 hours. In about half the cases swelling occurred at the site of both toxin and control injections, but Massey and Gilmore state that the "control" arm showed no reaction in their patient. In the remaining cases, local symptoms were not recorded. Local reactions usually consisted of a severe weal with "pseudopodia" branching out in various directions. In one case which I observed this was followed by a reddened area about 15 cm. by 8 cm. in extent. Some, but not all, of the patients were pseudo-reactors to the Schick test.

In nine cases puffiness of the face was an early manifestation, most noticeable in the lower eyelids and around the lips. In one of my patients the arms were held away from the side because of swelling in both axillæ extending forward to the mammary line. Curiously enough this patient showed no urticaria, although weals developed in almost every other patient and were usually generalised. Scarlatiniform or erythematous rashes were also observed occasionally.

Other signs and symptoms included faintness, cyanosis, and dyspnœa, which varied greatly in degree. Bronchial asthma seems to have occurred in more than half the cases, and Freedman records laryngeal stridor in an infant. There is also mention in some reports of puffiness of the hands and face, swelling of the tongue, nausea, sometimes going on to vomiting and diarrhœa, pain in the epigastrium or back, general oppression in the chest, coughing, restlessness, and slight temperature.

TREATMENT

The usual treatment has been to inject adrenaline (0·5 to 1·0 c.cm. of 1 in 1000 solution) intramuscularly as soon as possible, repeating the injection if necessary within 15 minutes, and to put the patient to bed. Some American workers have applied a tourniquet tightly to the upper arms to prevent rapid dissemination of the injected material. It has been stated that if pressure is released too soon the previous symptoms recur. The patients were for the most part well next day, although rest in bed was advised in my own cases as a purely precautionary measure.

DISCUSSION

Monroe, Volk, and Park had only two cases of allergic reactions to the proteins in the Schick reagents

amongst some 7000 immunised. It is of interest that the earliest recorded cases which I have been able to trace were in 1934, more than 20 years after the introduction of the Schick test. Moreover, I have found only seven recorded instances of allergic phenomena, although up to the present many hundred thousand Schick tests in different countries have come under review. I have notes of seven others, hitherto unpublished, and altogether fourteen cases are reviewed in this paper. I have long suspected the occurrence of other cases, and Freedman, in a recent personal communication, has kindly informed me that several physicians in America have observed allergic reactions of varying degree following a Schick test performed some time after a previous Schick test.

An allergic response to a Schick test does not appear to occur except after previous injections of foreign serum, prophylactic, Schick test fluid, and so forth. It is probable that asthma or hay-fever would also predispose to its occurrence, and in two cases published in America there was a past history of eczema. Recent investigations by Bousfield on a patient who gave a more severe reaction than any so far recorded, suggest that the Witte peptone in some of the stabilisers of Schick test fluids now in general use in different countries may be an important factor in inducing the phenomena. Incidentally, two of the cases reported in this paper were known to be allergic to Witte peptone.

In view of the rarity of the hypersensitive state, practitioners need not be unduly alarmed, nor hesitate to perform a Schick test where indicated. The worst of the reactions caused some anxiety for a time, but the subjects soon recovered completely. Precautionary measures however are indicated. Probably all practitioners carry adrenaline in their bags, and there should be no difficulty in improvising a tourniquet for application above the point of injection, as recommended by American workers.

SUMMARY

The Schick test has in very rare instances been followed by an allergic reaction.

I wish to acknowledge my indebtedness to various clinical colleagues who very kindly sent me information about their cases; also to Dr. Joyce Wright for her help in most unusual emergencies.

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BRITISH MEDICAL ASSOCIATION

MEETING AT OXFORD

SECTIONS OF ANÆSTHETICS AND OBSTETRICS AND GYNÆCOLOGY

Prof. H. BECKWITH WHITEHOUSE (Birmingham) presided at this combined meeting of two sections when a discussion was held on

Anæsthetics in Labour

Dr. K. G. LLOYD WILLIAMS (London) stated that though chloroform was still often the only possible anæsthetic for use in domiciliary practice (especially in country districts) the use of gas and air or gas and oxygen was still steadily increasing. These mixtures were chosen for their low toxicity, though it was doubtful if either alone was really sufficient for actual delivery. To procure relief of pain, and this was now generally accepted as necessary, was more difficult in the first than in the second stage of labour, though not less desirable of achievement, as that was often the most wearisome and painful part of the whole confinement. The relief required was that which would induce some hours sleep and refreshment rather than the intermittent relief suitable in the second stage between pains. Drugs—notably morphine and scopolamine in the first stage, followed by the barbiturates with gas and oxygen later in the second stage—were useful in normal labour, but a number of long drawn-out cases occurred in which further analgesic measures were desirable; and for these, rectal anæsthetics—avertin, paraldehyde, ether—had proved of value at the Royal Free Hospital during the last three years. Tables showing the results obtained in 50 cases with the use of the two latter were shown by Dr. Lloyd Williams. Ether was generally preferred to paraldehyde, which caused some restlessness after injection and had a smell which made it unpopular in a general ward.

Rectal ether was preceded by potassium bromide grs. xxx., chloral hydrate grs. xxx., given in glucose lemonade at an early stage. This might be followed by 1 c.cm. opoidine in 2 c.cm. magnesium sulphate given intramuscularly as pains increased. If relief was not obtained rectal ether was injected according to Gwathmey's formula:—

Quinine alkaloid	.. ..	grs. xx.
Alcohol ..	.. .. ..	♏ xl.
Ether ..	.. .. ..	ʒ ijs.

in ʒ iv. olive oil.

The mixture was warmed and run in slowly and olive oil ʒ i. added; three to four hours' excellent analgesia and amnesia were thus obtained. The technique for paraldehyde was similar with the omission of the opoidine. Gas and air or gas and oxygen were used for the second stage, with additional ether if necessary for actual delivery. Vinyl ether had also been used at this stage and in rapidity of action much resembled chloroform. The advantages of such a method were fourfold: (1) Three to four hours' excellent analgesia was obtained. (2) It was cheap and safe and the drugs used could be safely kept as stock mixtures. (3) No elaborate technique was necessary. Any skilled person could give the injection. (4) The method was suitable for pathological cases—i.e., patients with heart disease. While this was in no way a new technique the series was of special interest, since rectal methods had not obtained in this country the popularity they deserved.

Dr. R. J. MINNITT (Liverpool), speaking on gas and air analgesia, gave details of over one thousand administrations to obstetric cases between 1933 and 1935. Good relief from pain had been obtained in 952 (92·8 per cent.). The length of time during which gas-air was administered varied within the following limits: over 4 hours (80 cases); between 2–4 hours (169 cases); between 1–2 hours (239 cases); under 1 hour (464). The number of forceps deliveries in the series was 56 (5·5 per cent.) and the number of stillbirths in the series (all but one being due to obstetrical causes) was 19 (1·8 per cent.). Dr. Minnitt emphasised the fact that this method was analgesic rather than anæsthetic. While it might still be found advisable to resort to ether or chloroform for actual delivery, such analgesia as gas and air afforded was the more urgent need during the long hours before actual delivery was possible. The relief of pain

obtained was remarkable, and contractions became much more effectual. The only known contra-indication to this form of analgesia was the presence of cyanosis—e.g., in cases of heart disease or of recent bronchial cold. Various forms of apparatus were shown by Dr. Minnitt including: (1) A hospital model on movable stand. (2) A doctor's model, with two 50-gallon cylinders (weight, without cylinders, 15 lb.). (3) Midwives' models, without cylinders: (*a*) the original apparatus (weighing 14¼ lb.), in which a cylinder could be connected to the side of the case, overhanging a table; (*b*) a later model (weighing 9¼ lb.) embodying the same principle made to fit the carrier of a bicycle, and for use with cylinders sent in a special box which acted as a stand. This would be supplied by the manufacturers of nitrous oxide to any patient's house.

Mr. L. CARNAC RIVETT (London) considered that when instruments were to be used or any form of operation was to take place, a second medical man was essential, and even in a normal labour his presence was often desirable; but since 65 per cent. of births were conducted by midwives in patients' homes, it was for such births that analgesics were sought and these were hard to find. He still considered that chloroform was the best analgesic, easiest to regulate, and per se the most satisfactory. The occasional intolerance for the drug which produced (though very rarely) chloroform poisoning made it, however, unsuitable for the use of midwives. He, too, had thought out an apparatus for gas and air for the use of midwives, and in view of the fact that spanners were tools not easily handled or understood by women he had devised a machine in which they did not occur. The weight of the apparatus was 18 lb., including the cylinder. This had been in use for three months now at Queen Charlotte's Hospital and had proved very satisfactory. Mr. Rivett paid a tribute to Dr. Minnitt's work. He felt sure that we were exploring on right lines, but he still felt that gas and air were insufficient for the delivery of the head.

Mr. LEONARD PHILLIPS (London) also expressed appreciation of the work done by Dr. Minnitt in the popularisation of gas and air analgesia. Unfortunately for the production of analgesia no two women were alike in their reactions. Mr. Phillips had had success with rectal anæsthetics but found them subject to certain disadvantages—i.e., difficulty of retention if the fœtal head was low, possible proctitis, and an unpleasant smell lingering even after delivery. Moreover rectal anæsthetics ceased to be safe if labour was protracted for three to four days. His own technique was that of drugs varied according to the need of each patient. Usually, after the establishment of regular pains, he gave omnopon gr. 1/3 and scopolamine gr. 1/150, followed two hours later, when their effect was wearing off, by two capsules of nembutal, and within half an hour the first dose of chloral, gr. 30 in three ounces of lemonade, taken slowly. Two hours later a further capsule of nembutal, followed again by chloral, was given, both to be repeated if required in another two to three hours. Such technique he had found would keep a patient unconscious of her labour until the head was on the perineum. As for avertin, his experience was that patients given this drug looked grey and pallid even after delivery, and it was often some hours before they became conscious, or could be visited by an anxious husband.

Dr. H. W. FEATHERSTONE (Birmingham) was enthusiastic in his praise of Dr. Minnitt's gas and air apparatus and its service to the community. He had found nembutal useful but apt to cause vomiting; it was only suitable for use in small quantities and by qualified practitioners. Chloroform was still of great value, but not suitable for midwives except in capsule form. He had submitted himself to experiment with the gas-air apparatus, but was of opinion that that shown by Mr. Rivett required too much effort on the part of the patient.

Dr. HELEN RODWAY (London) spoke of the difficulty of ensuring analgesia or loss of sense of pain without loss of consciousness. She stressed the need for previous examination of the patient in order to determine the most suitable analgesic to use. Drugs should not be given till uterine contractions were well established, and she thought it wiser to reserve inhalation analgesia till the second stage.

Mr. C. S. LANE-ROBERTS (London) thought Dr. Minnitt's work gave a line for future investigation. The Junker with chloroform would always remain of value, either given by a medical man or by the patient herself, but in his opinion the head could be safely crowned under gas and oxygen provided the breathing was carefully regulated.

Dr. Z. MENNELL (London) spoke in favour of chloroform properly used; he considered that its disrepute was entirely due to improper administration. No analgesia produced by other methods was as complete as that obtained under chloroform, and it had the additional advantage of being practical for self-administration in a Junker apparatus. He expressed himself as strongly in favour of chloroform; its danger lay in the re-anæsthetising of patients. No other anæsthetic agent gave such complete analgesia and amnesia as chloroform.

Dr. R. FRANCIS JONES (Tamworth) showed an ingenious modified Shipway for use with ether which he had found remarkably useful in his own practice; it was fool-proof in its connexions and compact for transport.

Dr. LLOYD-WILLIAMS, in replying, emphasised the fact that rectal analgesics were for use only in cases of prolonged labour; otherwise gas with either air or oxygen was the anæsthetic of choice. She expressed her agreement with Dr. Mennell that in country work chloroform was still of the greatest value.

SECTION OF NEUROLOGY AND PSYCHOLOGICAL MEDICINE

AT a meeting of this section on July 23rd, with Dr. THOS. SAXTY GOOD (Oxford), the president, in the chair, a discussion on

Delirious States

was opened by Dr. BERNARD HART (London). Several problems arose, he said, in considering these states. Had they a specific causation and mechanism? Did they differ according to the causal agent, so that the nature of the cause could be deduced from the clinical picture? What part did constitutional and psychogenic factors play, and did the study of delirious states provide information about the origin of psychotic symptoms in general?

While febrile delirium was an easily recognisable and characteristic syndrome, there were imperceptible gradations between it and conditions which seemed only remotely related to it. Delirium tremens, with its confusion, disorientation, hallucinations, associated fear-affect, and short course, was a typical delirium produced by the abuse of alcohol; but other deliria caused by other exogenous toxins

lacked some of the characteristic features. A second group comprised cases presumably due to endogenous toxins—in uræmia, after operation, or in extreme inanition. A third included delirium in senile psychoses, general paralysis, and traumatic conditions. These might by analogy be regarded as toxic, but the theories of Hughlings Jackson suggested that this might not be the true explanation. Less typical forms which might be styled "attenuated deliria" included those states known to English psychiatrists as "confusional insanity." Their features included confusion with imperception and disorientation, hallucinations of all the senses, motor restlessness, a duration of some months, and a fairly good prognosis. The disorder had been shown to follow definite toxic states, either endogenous or exogenous, and it could also be a sequel to excessive fatigue and emotional stress; the link might be through chemical processes associated with fatigue or emotion. A further difficulty was that typical deliria might develop in the course of other disorders such as schizophrenia and in psychogenic disorders such as hysteria. It was impossible at present to say how far delirium could be considered an entity; it could only be said that it was usually preceded by certain factors bearing a genuine resemblance to one another and included under the somewhat indefinite term "toxic." In discussing the probable pathogenesis it was therefore necessary to enter the sphere of hypothesis and speculation.

Hughlings Jackson had postulated that injury to any layer or centre of the brain might be either "destroying," whereby function was diminished or abrogated, or "discharging," whereby it was stimulated. Destruction of a higher centre meant liberation of a lower from normal control. Jackson had applied these theories to delirium, which he ascribed to over-activity of normal lower centres owing to a destroying lesion of the higher centre. This explained most of the phenomena of delirium and especially the various nature of the conditions in which it occurred and the variability of the symptoms produced. It did not however explain the *content* of a delirium, and it had been suggested that this depended on the individual equipment and experience of the patient. It was, moreover, possible that the lower centre was not only overacting but was acting abnormally because it also was affected by a "discharging lesion."

Discussing the relative significance of the terms "organic" and "psychogenic" as applied to delirium Dr. Hart pointed out that the word "functional" was sometimes used as an equivalent to "psychogenic" and sometimes as meaning a lesion for which no structural basis had yet been found. He suggested that the term "psychogenic" should be regarded only as meaning that with our limited knowledge of neurological processes a psychological conception of it was the more helpful. A "functional" condition might be regarded as one in which the causal factors acted through the ordinary channels—e.g., a hysterical hemiplegia in which the arm is kept still by the normal mechanism. An "organic" condition was one in which the causal factors, so to speak, impinged on the machinery from outside—e.g., a hemiplegia due to hæmorrhage. Applying this to delirium the primary causal factors were usually "organic" and consisted in a modification of the brain substance produced by a toxin, degeneration, or conceivably by neurological modifications resulting from processes at present regarded as psychogenic—e.g., in hysterical delirium. And the activity of the lower centres in delirium was either functional or (at least partly) organic, according as the lower centre was merely released (owing to cortical damage) or was itself damaged.

Dr. DESMOND CURRAN (London), speaking on prognosis, said that this became more difficult in cases that departed from the typical delirious syndrome. No single manifestation of a delirious state could be traced to one ætiological agent and that alone; the same disturbance was produced by many causes differing only in so far as the "noxious dose" differed in intensity and duration. Certain people appeared to have a personal and constitutional predisposition; thus the young and the elderly arterio-sclerotics were especially prone to delirium. These facts were helpful in predicting occurrence and also recurrence and also anomalies and complications. Most cases cleared up when physical recovery took place. In three-quarters of a series of 106 cases of diverse origin the duration was less than three weeks, but some of the patients died. Moreover there were some important exceptions in regard to mental recovery. For example, delirium might be only an episode complicating a pre-existing psychosis, or it might be a prelude to the development of a psychosis. An important group was that of the puerperal confusions. Delirium had a worse prognosis if it had no obvious exogenous cause. There was considerable difference of opinion about prognosis in the Korsakov syndrome, but this was now so uncommon in Great Britain that few people had much experience of it. The great importance of the constitutional and personal factors in assessing prognosis must never be lost sight of.

Dr. IAN SKOTTOWE (Aylesbury) said that, setting aside delirium associated with frankly definable poisons such as alcohol, and localised lesions such as pneumonia and typhoid, there remained the toxic and exhaustive delirious states which came under the term "acute confusional insanity"—a deplorable and misleading expression. In this group of cases there were profound changes at the somatic level, characterised by pulse and temperature changes, gastro-intestinal disturbance, and rapid loss of flesh. These changes in turn caused further changes at the central nervous level, so that the sensorium presented an untrue picture of reality to the subject. Emotional and conative patterns were released in the more personal part of the psyche. It was not easy, however, to be sure at which level the change began; treatment must be based on recognition that we are dealing with a vicious circle. This could be attacked from several points. Nourishment was probably the first necessity: a generous dietary with glucose was essential, artificial feeding should be started at once if food was refused, and 6–8 pints of fluid should be taken in the 24 hours. Some generalised attempt at detoxication was also necessary. The wet pack, heat bath, and continuous flow bath involved risk of syncopal attacks. He preferred to have patients nursed in bed in the open air, even in the winter, for the incidence of bronchopneumonia was thus greatly reduced. At the psychic level treatment by prolonged narcosis with barbiturates was the most successful. By putting the mind and body at rest death from exhaustion was avoided and patients were given every chance to regain their balance. The toxicity of the barbiturates did not in his opinion constitute a contraindication. Quastel's researches into brain metabolism, and oxidation in particular, had practically laid the bogy of barbiturate poisoning. On recovery the

patient was in a suitable state of suggestibility for psychotherapeutic treatment. The system of treatment outlined required mental hospital conditions; delirious patients should never be certified but should be admitted in the "temporary" category.

Dr. WILLIAM BROWN (Oxford) said that psycho-neural parallelism was accepted to-day by every philosopher, although psychophysical parallelism was still an open question. In 1 per cent. of his cases treated by prolonged analysis, mild delirious states developed. A possible toxic factor could not be excluded, but he believed that these states were largely due to disturbance of the vegetative nervous system and endocrine glands as a result of the rapid release of certain repressions and the evolution of reactions at a deeper psychological level. He thought that analysis was useful in the recovery stages of the Korsakov syndrome.

Prof. BURRIDGE spoke of the modern view that there was no evidence for the existence of higher and lower "centres."—Dr. FOSTER-KENNEDY (New York) said that in delirium there was a reversion to a primitive type of thinking.—Dr. MARY BERKELEY believed that the ingestion of fluids in greater quantities by women might sometimes prevent the onset of delirious states.—Dr. FREWEN MOOR (Norwich) said that as a general practitioner his experience of delirium was largely related to the terminal stages of life in old people—what Clifford Allbutt had termed "cardiac delirium." This was of course usually fatal. Disorientation of place was a typical feature. The patient was normal during the day and delirious at night. Treatment was of little avail.

Dr. LUCIE VAN DAM (South Africa) stated that the prognosis of the Korsakov syndrome was very bad in South Africa.—Dr. W. MAYER-GROSS (London) said he had been studying senile delirium at Tooting Bec Mental Hospital. If we could find special symptoms associated with special lesions it would be of great help. He thought the theory of the "centres" discussed by Dr. Hart was unsatisfactory.—Dr. ELIZABETH CASSON (Bristol) suggested that we might learn something of the content of deliria by studying our own delirious experiences. She thought there was a high degree of amnesia which might account in part for the increased suggestibility.—Dr. RICHARD EAGER (Exminster) attributed deliria partly to toxins and partly to constitutional factors. He agreed with Dr. Skottowe about the importance and value of tube-feeding which was often delayed too long. He also approved strongly of prolonged narcosis.—Dr. RIDDOCH pointed out that in traumatic delirium there might be some cerebral anoxæmia. Oxygen was a help. Hughlings Jackson was referring to "levels" of the brain and not to "centres" in the anatomical sense.—Dr. NEUMANN, Dr. H. T. GILLETT (Oxford), Dr. CHAMBERS, and Dr. BATES also took part in the discussion.

The PRESIDENT, in summing up, did not approve the use of the feeding-tube, or prolonged barbiturate narcosis, but agreed that it was necessary to build up the patient's resistance. Gramophone records of patients' delirious ramblings had led to much information about the psychological causes of their illness.

Phantom Limbs

Dr. GEORGE RIDDOCH (London), in a paper on phantom limbs, said that after amputation it was usual for the patient to experience sensations as if his limb were still present. These phantom limbs might be painless or painful. The former might develop not only after amputation but also after damage of peripheral nerves (rare and partial), of plexuses (usually brachial), of posterior roots (e.g., in tabes), or of posterior columns, or after complete division of the spinal cord. Painful phantom limbs in his experience developed only after severe lesions of peripheral nerves (e.g., amputation of a limb or, occasionally, the removal of a tooth) and after great damage to a plexus or to posterior roots. The pain usually appeared immediately or soon after operation; in a limb it usually affected the hand or the foot predominantly but might represent the whole amputated part. Pain might show periodic exacerbations, but was persistent, usually as a dull ache or burning or throbbing. The painful phantom was felt to move with the stump, but voluntary movement of the phantom itself was limited and attempts to move it aggravated the pain. Any lowering of the patient's health or resistance aggravated the pain and emotional instability was an almost inevitable complication, as in all disorders where incessant severe pain was present. Lateral chordotomy or section of the lateral spinothalamic tract often cured the pain while leaving the phantom still in apparent connexion with the stump.

The phantom, said Dr. Riddoch, was a manifestation of the sensory function of projection—that is to say of those aspects of sensation by which we recognised, without touch or vision, the constantly changing outline of our bodies and the relationship of one part to another. When a limb was cut off stimulation of the proximal ends of the divided nerves evoked sensations which were projected and interpreted as if the limb were still present. It was only as the phantom became fainter with diminished stimulation of the healing nerves that it approached the stump and finally disappeared; in other words that the individual accepted a new shape of his body. Phantom limbs following lesions of the plexus, posterior roots, or spinal cord usually appeared to be in positions other than those of the real limbs when these had not been amputated; the important factor here was probably the extent to which postural sensibility was lost. In cases of persistent and painful phantoms structural changes in the nerves of the stump had been demonstrated; there were tender end-bulbs and interstitial neuritis. In such cases physiological as well as psychological inhibition diminished and the patient could not learn to adjust himself to a new body shape. This was another illustration of the dominance of pain over adaptive functions.

Dr. FOSTER KENNEDY asked what result chordotomy had on pain in the stump and painful phantom limbs.—Dr. RIDDOCH replied that the pain disappeared.—Dr. J. R. BENSON (Salisbury) said that in a case of his own of congenital amputation, there had been no perception of any phantom.—Dr. SCOTT (Penshurst) spoke of the occurrence of unreality feelings, in relation to the body, in psychoses, and of delusions of multiple limbs in depersonalisation cases.—Dr. SILVERMAN asked whether children and infants after amputations developed phantom limbs in later life.—Dr. CURRAN asked whether massage was of value in such cases.—Dr. NEUMANN asked whether right- and left-handedness played any part.

The PRESIDENT pointed out that idiots often had no appreciation of pain. Prof. le Gros Clark had demonstrated fibres connecting the thalamus with the prefrontal lobe. Could changes be demonstrated in these fibres in such cases?—Dr. MAYER-GROSS

asked how it was that in some cases the hand, wrist, or elbow phantom was preserved and the rest of the stump faded out of consciousness.—DR. LAMORNA HINGSTON (Hove) asked whether the different positions of the phantom limb could be accounted for by the nature of the trauma.

Dr. RIDDOCH, in replying, said that no phantom limbs developed after congenital or infantile amputation. The parietal sensory cortex was the part of the brain concerned with spatial relationships, and was the only one affected in these cases. The fibres described by le Gros Clark had no direct relation to the condition. Those parts most endowed with sensation, such as the hand, wrist, and elbow, persisted in consciousness, because they were more heavily represented in the cortex. There was no special relation to right- or left-handedness. Psychological factors played a part, but the phantom limb was of organic origin and quite a different matter from functional or psychogenic imaginings.

SECTION OF MEDICAL SOCIOLOGY

AT a meeting of this section on July 24th Sir GEORGE NEWMAN (London) took the chair and opened a discussion on

Medical Problems of School Life

by saying that no doctor could, in practice, help being a medical sociologist. Out of such fundamental social needs as sanitation, one day of rest in seven, daylight saving, public water-supplies, the relief and housing of the poor, schooling, industrial welfare, and the provision of hospitals, with the assistance of the art of medicine, the public health services of the nineteenth century had arisen. The Mosaic law had been largely negative, but government by statute was now more positive than negative, and with the growth of compassion government had grown more humanitarian. The nature of man was a complex biological unity of the physical, the intellectual, and the spiritual, and these needs must all be regarded by government. Not the best could be our aim, but the best that was practical.

Dr. G. E. FRIEND, medical officer to Christ's Hospital, spoke on

SCHOOL DIETETICS IN RELATION TO PHYSICAL EFFICIENCY

He based his remarks, he said, on a review covering 20 years, which included the war period, of the 830 boys living under centralised conditions in Christ's Hospital. Besides the construction of the dietary, the purchase, preparation, and ingestion of food, and its proper absorption and disposal all required careful thought and control. The commoner faults in institutional feeding were: (1) the basis of diet tables was too often purely empirical, and overfeeding was as potent a cause of malnutrition as underfeeding; (2) too short a time was allowed for meals; (3) early school and chapel before breakfast were harmful; (4) lack of variety in the daily menu; (5) lack of proper service of meals; (6) a diet scheme not sufficiently adapted to seasonal change; (7) lack of proper supervision of meals and too little regard for the amenities of the table and appurtenances; (8) bad cooking, which should perhaps have come higher in the list; (9) insufficient free time after meals, especially after breakfast and dinner. Children of school age, especially in a boarding-school, were animals living in a state of physiological captivity. Indications were not wanting that the ideal diet would be found to contain less protein and more fat in relation to carbohydrates than was at present regarded as necessary. Vitamins A, B-complex, C, and D were necessary to health and growth, and an excess of one would not compensate for the shortage of another. To guard against deficiency, as great a variety of foodstuffs as possible should be used, always including milk, cheese, Australian or New Zealand butter, fresh vegetables, and fruit. In the average school diet some lack was most likely in the case of B and D. The vitamin content of wholemeal flour depended on the amount of coarse bran and middlings removed and on the amount of white flour added to produce an economic texture in the loaf. There might be much less vitamin and mineral salts present than the term whole-meal suggested; it did not necessarily imply "whole-grain." The daily food was best divided between breakfast, dinner, and tea. A five or five and a half hour interval between meals was not too long and conduced to a sharpened appetite. Some of the more striking features in the 20 years' survey were as follows: the attack-rate of fractures rose with the substitution of margarine for butter, and returned to normal when butter was reintroduced into the diet; a progressive fall in the incidence of acute and subacute rheumatism was coincident with an increase of animal fat in the diet; gastro-intestinal disorders had declined with improved feeding; cases of pyrexia of unknown origin had decreased, but catarrhal conditions and the complications of influenza had increased, with an increased diet; minor sepsis, boils, and whitlows had increased with increased sugar; the height and weight records showed an improvement corresponding to the increase in diet. But although normal bodily growth had been achieved there was not yet proper resistance to infection. He believed this to be a matter of right and wrong balance.

Dr. E. H. M. MILLIGAN, medical officer of health and school medical officer of Glossop, discussed

DIETETICS AND THE NUTRITION OF THE SCHOOL-CHILD

He had carried out investigations, he said, to decide whether the diet of the lower-paid wage-earners and their children in Glossop was deficient, and had found that the weight : height ratio of children in the distressed area was lower than that of children elsewhere, and that children of the unemployed had shown a lower ratio than children of the employed. Moreover, 44 per cent. of the children of professional parents, as compared with 7 per cent. of the children of labouring class families, had shown a hæmoglobin percentage of 80 or over. It became necessary to decide what was an adequate dietary to maintain health, and how far the home dietary of schoolchildren fell short of this standard, and this was done. But as a preliminary measure school-children were given milk and sandwiches, in which they received those articles of diet which the parents were unable to provide in sufficient amount. One, two, or even three bottles of milk, of ½ pint each, were given with every sandwich. The sandwiches consisted of brown bread and butter with raw vegetables, lettuce, or tomato, or cheese, and, recently, added yeast. The heights and weights of the children were recorded, and in addition their strength was tested by the dynamometer and their endurance by getting them to hang on to a horizontal bar as long as possible. Defective nutrition was a complex of lack of growth, clinical defects, and deficient strength and staying power. He emphasised the

importance of finding out what the child was having at home before deciding what to give at school, and of controlling the results by weighing and measurements.

Dr. WILLIAM BROCKBANK, medical officer at Manchester Grammar School, introduced the subject of

HOMEWORK

Most parents, he said, and strangely enough most boys working for the higher school examinations, were in favour of homework, regarding it as a regrettable necessity. Members of the teaching profession considered it an essential part of education, and though it had often been pointed out that they had not to do it, they spent many weary hours correcting it. The point was that the boy did it alone, with, or better without, some slight unskilled help from his parents. It had been suggested that homework should be done at school in the form of "preparation," and that school hours should be correspondingly longer, but there were serious objections to this. The boy doing homework learned the art of private study. A day school usually had many outside activities—debating, dramatic, scouting, musical, literary, or scientific—timed to begin at the end of school. If "prep." were done at school these would have to be discontinued. At a boarding-school the work was spread through the day from 7.30 A.M. to 8.30 P.M., but in a day school it would be crammed in between 9.30 A.M. and 5.30 P.M. Would that be good for the boy? The hardworking master was the one who set most homework, while the lazy master set little or none. Clever boys, who finished their homework too quickly, could be encouraged to do collateral reading, but the difficulties of the slow boy were important. They could be removed by placing him in the appropriate division of the form, and giving the parent the right to initial the homework at the end of a stated time. He was satisfied that homework did not affect a boy's health. Occasionally when a boy became listless and lost resilience, homework was a predisposing factor. The most serious cases had all occurred in boys working for scholarships or higher examinations, and without exception they had been working longer than was desirable or necessary. Some boys were overworked by pressure from their parents; these might either get the school certificate too early and then collapse mentally, or they might become worried and lose health. Lack of sleep, in other cases, was responsible for decline of athletic prowess. Masters were agreed that the standard demanded by the matriculation examination was too high, and the subjects unsuitable for the average boy. They requested an examination independent of that set up by the universities for their own needs; if this were done education would become less of a cram course. The solution lay in moderation and common sense. He thought it should be possible to ease the burden on the average boy; to train the studious boy to understand the pitfalls of overwork; to keep a watch on the individual boy who was suffering from the system, and see that there was close collaboration with the parent; and to make sure that the staff did not expect too much of their boys. But he did not think it desirable to abolish homework.

Miss I. M. DRUMMOND, head mistress of the North London Collegiate School, spoke upon

HOMEWORK AND PHYSICAL EDUCATION

She thought homework had been discussed too much in isolation. The aim was to encourage private study and to make children independent of the teacher. Schools now included æsthetic and athletic training. Games or gymnastics should find a place in the school day, and the school week included periods for music, art, and handicraft. Criticisms of the intellectual demands made upon the child took no account of the recreational activities of the school day. In some schools the plan of giving time for preparation at school had proved successful, in others it had been found that the work done after normal school hours lacked freshness. If some pleasures had to be put aside in order to get homework done, this was good character training. Some occupation for the mind was needed between 5 o'clock and bedtime in the adolescent period. Protests against homework usually came from parents who wanted to take a hand in the child's education themselves—and these had all the holidays at their disposal; or from fond and foolish parents who wanted the child to be a companion after school hours. Some parents filled up the child's evenings with dramatic and dancing classes. Miss Drummond felt that a little quiet homework was better for the child than additional guided activities after school hours.

Mr. F. R. G. DUCKWORTH, H.M. Chief Inspector, Board of Education, discussed

PHYSICAL EDUCATION

It was not easy, he said, for schools to fit into their time-tables a full course of physical training. The first time-table had come down from Mount Sinai, and even that had presented problems which had not yet been entirely solved. A test had been carried out in a secondary school in the north of England involving two forms, equal in age and ability. One form had held to the existing time-table which included, weekly, two periods of physical training and one of organised games. The other form had been given a daily dose of physical training, in time which had been taken from other school subjects. At the end of two years the physical measurements of the second form showed an improvement over those of the first form; and in the end of term examinations the second form sometimes did better but never did worse than the first form. The results were not conclusive but they were sufficiently encouraging to extend the experiment, and now five secondary schools were carrying out similar tests. Even if loss of time on physical training meant poorer school work, that did not mean that physical training was any less necessary. But if it helped the boy to maintain existing school standards with less expenditure of time, the change to a curriculum containing a daily physical training period could probably be effected with less friction.

Mr. A. D. LINDSAY, vice-chancellor of Oxford, said he had a strong impression that boys to whom scholarships mattered vitally were likely to overwork in such a way as to make it less possible for them to obtain scholarships. And some boys succeeded in getting a scholarship and then appeared to be finished intellectually. Would it some day be possible to arrange a plan on the lines of Rhodes scholarships, by which the boy had to give evidence of other capacities? A medical examination would discover whether he was mentally or physically exhausted.

Dr. CYRIL NORWOOD, president of St. John's College, Oxford, endorsed Dr. Brockbank's plea for moderation and common sense. He was not convinced that the change of one article of diet

produced all the results it seemed to do. Each child needed studying individually, and he would like every school to have a medical officer who knew every child personally. Boys survived the effects of too much homework by refraining from doing it. The burden should be measured according to the ability of the individual child. It was essential to give children some free time after breakfast, and to bring them directly from work to the midday meal. If there was a gap, they filled it with a visit to the tuck shop.

Miss E. M. TANNER, head mistress of Roedean School, remarked that girls had not the same self-protective ability as boys when afflicted with too much homework.

Dr. E. K. LE FLEMING said that the physical education committee had discussed the burnt-out athlete with Mr. H. M. Abrahams, who had said that boys were often so worn out by physical training that they failed to develop to a maturity of excellence. Mr. Lindsay had found the same thing on the intellectual side. It was difficult enough to assess physical fitness; and the present methods of mental assessment were wrong. Qualities of value in outside life were not examined for, under our present system, and therefore were not cultivated as they should be.

Miss M. T. TALBOT said she was a cookery instructor in a poor district, and she considered not enough attention was given to local tastes in drawing up dietaries. Tastes varied greatly in different districts, and it should be possible to begin with those articles in the local diet which were good and build up a diet based upon them.

Dr. J. G. WOOLHAM drew attention to the value of the Royal Air Force tests for assessing physical efficiency.—Sir ROBERT MCCARRISON urged the value of a proper supply of vitamin B, which was mainly distributed in grain; the more purified the cereal the less the vitamin-B content. He also put in an approving word for the herring as an article of diet.—Dr. MORTLOCK BROWN entered a plea for a piped water-supply in labourer's cottages. Much money had been spent to subsidise certain foodstuffs but very little to ensure safe and adequate water-supplies. This handicapped particularly the mothers in the management of their homes.

Dr. GEORGE V. PORTER, of Toronto University, said that physical training was compulsory at all universities in Canada and the United States. As a result, all students had to submit to examination by the medical staff, and this made it possible for the doctor to advise the student on points affecting his choice of career and his future.

Mr. WARREN DERRY, head master of Wolverhampton Grammar School, reminded his hearers that people who talked of the hard lot of children in secondary schools seldom compared them with children of the same age employed in industry. A sixth form boy did 40 hours work a week and had 15 weeks' holiday yearly.

Dr. D. R. EDWARDS mentioned the value of swimming as a form of physical training.—Dr. R. E. SMITH, medical officer of Rugby School, said that one symptom of overwork was for a boy to be wound up like a clock. If you put him to bed and gave him a *Strand Magazine* he instantly began to do the "perplexities." These boys responded well to small doses of bromide. He thought the scale of games should be reduced for small boys. Boys at preparatory school played cricket on a pitch 21 instead of 22 yards long, but it should be much shorter.—The openers of the discussion replied.

REVIEWS AND NOTICES OF BOOKS

The Extra-Ocular Muscles

A Clinical Study of Normal and Abnormal Ocular Motility. Second edition. By LUTHER C. PETER, A.M., M.D., Sc.D., Professor of Diseases of the Eye in the Graduate School of Medicine of the University of Pennsylvania. London: Henry Kimpton. 1936. Pp. 351. 21*s*.

Dr. Peter's monograph, long a standard work, has now been brought up to date. The first part—nearly a quarter of the whole book—gives a good account, first of the anatomy and fascial connexions of the eye muscles and the paths of the nerves which connect them with the brain, then of their physiology; and in this connexion the point is stressed that in any movement of the eye all the muscles and not merely one or two are concerned. There is also a section on the theoretical aspects of binocular vision.

The second part of the book deals with heterophoria and its various forms, their symptoms and treatment. Heterophoria implies that the external muscles are not perfectly balanced, so that even in the position of rest some of them have constantly to do extra work in order to maintain binocular vision. Some sorts of want of balance may be comparatively innocuous, others may prove too great a strain on the nervous system and may therefore require treatment either by prismatic glasses or in rare cases by operation. Errors in the vertical meridian are always more important than those in the horizontal, but the sort of error that is liable to produce most disturbance of all is a want of balance in the muscles causing torsion of the eyeball—cyclophoria. It is often associated with oblique astigmatism, and an accurate correction of the refraction may be enough to relieve it. If it is not, the author discusses treatment by exercises with cylinders calculated to strengthen the weak muscles or the possibility of prescribing weak cylinders calculated to relieve them of some of their work. In any case the first essential in treating any form of heterophoria is accurate refraction.

The next part of the work deals adequately with "heterotropia" or concomitant squint, and some attention is paid to the modern treatment by orthoptic exercises, though for a full account of the methods now being tested it would be necessary to go elsewhere. Paralytic squint is then fully discussed, and then follows a section on surgical technique in which the author's favourite methods of operation are described. The work closes with a short section on nystagmus. The book affords a comprehensive view of its subject.

Manual of Emergencies

Third edition. By J. SNOWMAN, M.D., M.R.C.P. London: John Bale, Sons and Danielsson Ltd. 1936. Pp. 401. 10*s*.

IN this third edition Dr. Snowman has incorporated the modifications and advances which have recently been made in our knowledge of the nature and treatment of the dangerous emergencies of medicine, surgery, and obstetrics. The book covers

a wide field, including the respiratory, circulatory, nervous, alimentary, and genito-urinary systems, as well as an account of acute poisoning and the emergencies which occur in midwifery. It is intended primarily for general practitioners, and since it is of such a size that it may be slipped into a pocket or a small hand-bag it may well prove a valuable help in many difficulties. It is true that the book contains nothing which cannot be found in standard text-books, and that the industrious student will have made his own abstract of its subjects in the course of his reading. But it is convenient to have the treatment of emergencies grouped together in one small volume, especially when there is little or no time to spare for hunting for the necessary facts. Some of the advice offered is clearly the fruit of the author's experience, and therefore most useful; in other sections the treatment advocated has just as clearly been taken from the printed word and is therefore of much less value. This applies particularly to many of the surgical emergencies, the description and management of which require correction and elaboration. The fact that the most alarming incidents in a doctor's life fall into this category provides some justification for the argument that the experience gained as a house surgeon is an essential preparation for the emergencies of practice.

Recent Advances in Genito-Urinary Surgery

By HAMILTON BAILEY, F.R.C.S., Surgeon, Royal Northern Hospital; Consulting Surgeon, Clacton Hospital; Surgeon and Urologist, Essex County Council; and NORMAN M. MATHESON, F.R.C.S., Surgeon, Central Middlesex County Hospital. London: J. and A. Churchill Ltd. 1936. Pp. 213. 15*s*.

IN the 200 odd pages at their disposal, the authors have collected in this book everything that is necessary to bring up to date the knowledge of a reader who already has a sound groundwork in genito-urinary surgery. In a work of this kind, compression is essential so that only the briefest outline of surgical technique or diagnostic methods can be given, and it is especially to the genito-urinary expert or the general surgeon with a good knowledge of this specialty that the book will appear invaluable. Any one of these who opens this book will read it from cover to cover and will marvel that so much valuable information can be compressed into so small a compass. In several places the whole of a new operative technique is epitomised in a single drawing, and epitomised more clearly than could be done by many paragraphs of text. The illustrations are excellent and the general make-up of the book maintains the high level established in this series.

Handbook of Surgery

By ERIC C. MEKIE, M.B., Ch.B., F.R.C.S. Edin., Medical Officer, Malayan Medical Service; formerly University Tutor, Royal Infirmary, Edinburgh. Edinburgh: E. and S. Livingstone. 1936. Pp. 699. 12*s*. 6*d*.

WITH recent developments text-books of general surgery have of necessity increased very much in size. The modern student has no light task when he sets out to read one of them for his pass examination; and, when he has systematically worked through it, he may find himself with insufficient time for a second reading. It is then that he should turn with gratitude to this small book. Though it has 700 pages, their size is small, and they contain a thoroughly sound epitome of surgery, by the study of which the student will find himself able to revise large sections of his subject in a very short time. Indeed if he keeps his larger treatise by his side for reference where the facts in the smaller book appear to need amplifying he will find himself getting through his work in a convenient and efficient way. Mr. Mekie has the gift of making his subject clear in a minimum of words. He has summarised surgery in an attractive and readable fashion. If the student realises the limitations of this manual he will undoubtedly derive profit from its use.

A Manual of the Common Contagious Diseases

Second edition. By P. M. STIMSON, M.D., Assistant Professor of Clinical Pediatrics, Cornell University Medical College. London: Baillière, Tindall and Cox. 1936. Pp. 440. 18*s*.

THIS is the second edition of a book designed to present in compact form and in concise manner the salient features of the common contagious diseases and recent developments in knowledge of these diseases. Dr. Stimson is visiting physician to the Willard Parker Hospital, New York, and his book, written to meet the requirements of both medical students and nurses in infectious diseases hospitals, reflects the practice of that well-known and progressive hospital. Competent accounts are given of the common acute specific infections of the upper respiratory tract—i.e., of those diseases which are conveyed mainly by droplet spray, thus excluding mention of erysipelas, the enteric group, and the dysenteries. The descriptions of meningococcus meningitis (Chapter XIII.) and of poliomyelitis (Chapter XIV.) are of outstanding merit, especially the latter. It is noteworthy that in every instance the account of methods of prophylaxis takes precedence of treatment. This is as it should be. For those whose work lies in fever hospitals or in children's wards one of the most valuable chapters is the last (Chapter XV.); nearly 50 pages are devoted to the general management of contagious diseases. The account of medical aseptic technique as carried out at the Willard Parker Hospital will come as a revelation to those who imagine that the medical administration of a modern fever hospital is a simple affair. The author considers that "to carry out an adequate medical aseptic technique in a ward, pavilion or entire hospital, the services of two nurses for each three patients are desirable." When, he adds, fewer nurses than in this proportion are provided, cross-infection, complications, and deaths are apt to increase, and in addition this expensive hospitalisation of patients will be unnecessarily prolonged. Training in aseptic technique is not confined to the medical and nursing staff at the author's hospital; ward maids and porters also receive adequate instruction. It is a pity that the price of this book is likely to prove somewhat high for the pockets of many nurses in this country, because it is one which every nurse engaged in the care of sick children would do well to read and to possess. The three plates borrowed from another work are really not very informative; unless these illustrations of the exanthemata are reproduced in full colour and by the most expensive processes they are rarely worth while and merely add to the cost of the book.

THE LANCET

LONDON: SATURDAY, AUGUST 8, 1936

HYPERTENSION: THE HEN AND THE EGG

VOLHARD was the first to point out that patients afflicted with high blood pressure can be divided into "red" and "pale" types, the former comprising cases of essential or benign hypertension, the latter including the more serious nephritic varieties, malignant hypertension and eclampsia. VOLHARD suggested that both the pallor and the high blood pressure of "pale" hypertension might be due to the presence of vasoconstrictor agents in the blood. But it is one thing to postulate and another to demonstrate. BOHN studied the problem, at VOLHARD'S suggestion, and reported that alcoholic extracts of blood obtained from "pale" hypertensives raised the blood pressure of anæsthetised cats. WEISER, MARX, and HEFKE, and ANSELMINO and HOFFMANN confirmed BOHN'S findings. On the other hand DE WESSELOW and GRIFFITHS, PAGE, AITKEN and WILSON and others have been unable to do so.

These discordant findings, attributable to the technical difficulties and numerous sources of error encountered in demonstrating pressor bodies, have led to widespread scepticism and, in England and America at least, opinion has been drifting towards the belief that the search was hopeless. Much interest is therefore likely to be aroused by a paper[1] in which Prof. PAUL GOVAERTS presents strong evidence for the existence of pressor agents in blood-serum, cerebro-spinal fluid, and alcoholic extracts of serum obtained from cases of "pale" hypertension. Dr. GOVAERTS uses anæsthetised dogs as test animals, records the carotid blood pressure, and injects the test fluid into the saphenous vein. In 11 cases of nephritis with high blood pressure, malignant hypertension, and eclampsia injections caused considerable rises in the animals' blood pressure. In non-hypertensive uræmia (7 cases), benign hypertension (7 cases), and in miscellaneous conditions unaccompanied by hypertension (19 cases) consistently negative results were obtained. The agent responsible is neither adrenaline nor pituitrin, for extracts prepared from blood to which these hormones had been added were inactive. Nor is it, apparently, a product of normal metabolism, since no trace of it could be recovered from normal blood. There is, however, substantial evidence incriminating tyramine, or some closely allied substance. It is known that constriction of the renal arteries of an animal leads to systematic hypertension and the appearance of tyramine in the circulating blood. Tyramine has also been found in the blood in "pale" hypertension, and, finally, Dr. GOVAERTS has found that he can get pressor responses, very similar to those obtained with hypertensive blood, by injecting solutions of tyramine. He therefore advances the tentative suggestion that the high blood pressor in "pale" hypertension is due to the presence of tyramine which is formed in the kidney as a result of impeded circulation.

This is a very interesting suggestion, for if the renal vessels share in the vasoconstriction caused by tyramine then more tyramine will be formed and an explanation is available of the vicious circle which is apparent in several forms of Bright's disease. Confirmation of Dr. GOVAERTS'S results should therefore throw some welcome light on the problem of hypertension. But complete understanding still seems remote. An attempt to analyse a vicious circle is rather apt to leave the inquirer asking himself the familiar philosophical poser—"which came first, the hen or the egg"? Dr. GOVAERTS has presented us with an egg in the shape of renal ischæmia and a hen disguised as the vasoconstrictor tyramine. What was responsible for the first egg? Was it another hen—that is, some unknown vasoconstrictor? It is not easy to accept this last suggestion. In the first place, it is very doubtful whether VOLHARD'S explanation of white hypertension is still tenable. Patients suffering from this condition are almost always œdematous or anæmic, or both, and the characteristic pallor must to some extent be attributed to these symptoms. Moreover, although peripheral vasoconstriction is certainly present in malignant hypertension, M. PRINZMETAL and C. WILSON,[2] and G. W. PICKERING,[3] working independently, have lately demonstrated that it is no less certainly present in "red" or benign hypertension. In the latter condition, where death is usually the result of cerebral hæmorrhage or heart failure, the kidneys show changes which have been universally attributed to ischæmia. Dr. GOVAERTS has shown that in spite of this renal ischæmia, the blood of such patients neither contains tyramine nor exerts any pressor effect. The egg was there. Why did it not hatch? It is to be hoped that future research will remove the problem from the realms of metaphysical speculation.

VIRUSES AND NEW GROWTHS

THE discussion which attracted most general attention at the International Congress of Microbiology held last week was undoubtedly that on "evidence concerning the agency of viruses in the ætiology of new growths." This was partly attributable to the universal interest in new growths, partly to the definite progress made in this particular aspect of their study, and partly to the fame of the investigators gathered together from the ends of the earth to exchange experiences. The committee were fortunate in securing PEYTON ROUS, whose achievements in this field (including his recent demonstration of the influence of a virus in the production of tar cancer in the skin of the rabbit) are most important, to preside at

[1] Bull. de l'Acad. Roy. de Méd. de Belgique, 1936, 6th ser., i., 141.

[2] Jour. Clin. Invest., 1936, xv., 63.
[3] Clin. Science, 1936, ii., 209.

the meeting and to open an exciting discussion. In its course G. P. BERRY and his colleagues described the steps by which they have shown that when the virus of rabbit myxomatosis is inactivated by heat, the addition of the Shope rabbit "fibroma" virus restores to the "dead" myxoma virus its original virulence. G. OBERLING, J. FÜRTH, and J. ENGELBRETH-HOLM gave accounts of the filtrable leukoses of fowls and discussed the association of the virus of these diseases with avian filtrable tumours. P. R. PEACOCK detailed a long and careful series of experiments in which he had failed to demonstrate the presence of a virus in a number of fowl sarcomata produced by the injection of tar. His experience appears to be shared by others, but on the other hand J. MCINTOSH recorded the successful transmission of such tar-induced fowl sarcomata by filtered extracts. The contributions of these and other speakers, though to some extent contradictory, all helped to clarify issues which have become so complex as to warrant some attempt at their re-definition.

The tumours which are caused by viruses are (1) a large group of sarcomata of fowls, diverse in structure and in clinical characters; (2) a papilloma of the rabbit which exhibits a tendency to become malignant, and in fact almost invariably passes into a squamous carcinoma; and (3) an adenocarcinoma of the frog. All these tumours, though induced by a virus, possess the same properties as the larger group of mammalian tumours in which no virus can be demonstrated. They grow by multiplication of the cells primarily affected, and they spread through the body by cell metastasis. They occur sporadically and are not contagious either under natural or under comparatively crowded experimental conditions. The infection, if the word is appropriate, is an infection of the tumour cells and not of the body of the host. It is evident that the virus tumours cannot be ignored in any discussion on the ætiology of new growths; nevertheless, it must still be recognised that in most tumours, both of the small mammals which form the chief material for experimental research, and of human beings, we have no definite evidence that a virus plays a part. There is one exception to this generalisation which has not received its full share of recognition—namely, certain brain tumours of man in which Dr. DOROTHY RUSSELL has demonstrated the presence of acidophilic intranuclear inclusion bodies.

The problem set by the existence of true neoplasms which are induced by viruses, and of true neoplasms in which it has not been possible to discover a virus, has not yet been solved. Experiments designed to throw light on it were described at the congress by C. H. ANDREWES and by W. E. GYE and L. FOULDS. These investigators have studied avian tumours produced experimentally by injections of tar or of dibenzanthracene. The tumours induced by carcinogenic substances are propagated only with difficulty by cell grafts and are non-filtrable, which implies that no direct evidence of the presence of a causative virus has been obtained. ANDREWES found that a tar tumour of this sort grows with comparative vigour in pheasants and that the pheasant host of the tumour develops during its growth an antibody, recoverable from the blood, which neutralises the virus of the Rous sarcoma. GYE and FOULDS injected rabbits with Berkefeld filtrates of a "non-filtrable" dibenzanthracene tumour, and found that the blood-serum of the rabbits acquired the power to neutralise viruses obtained from other filtrable fowl tumours. Evidence of this sort suggests that, although the filtrates of these growths have no power to start a new tumour in chickens, they nevertheless contain a virus immunologically related to, if not identical with, the virus which causes the Rous sarcoma. Does the virus thus obtained from an artificially induced tumour function within the tumour cells as a causative virus in the same way as the virus acts in a malignant cell of the Rous or other filtrable neoplasm? Or is the virus carried as a "passenger" in the substance of the tumour? If the first explanation turns out to be correct—and it seems unlikely that a tumour not caused by a virus would carry mechanically a virus which causes another tumour—it remains a puzzle that a tumour should be induced by a virus which is inactive when separated from the tumour cells. There are, it is true, analogous problems associated with other virus infections and the solution of even one such puzzle would doubtless provide clues to the rest. If the second suggestion is correct, that is, if the virus is carried as a "passenger," then we must make a different assumption, one vigorously upheld by T. RIVERS in the course of the discussion on this work. This assumption is that as the tumour started by the action of the chemical agent grows, the virus of the Rous sarcoma which may exist in a non-infective form within the body of the host,[1] is attached to the growing cells of the tumour and settles and lives harmlessly in or on the growing cells. This phenomenon of a virus finding a suitable nidus for growth in tumours has indeed been observed again and again. The virus of infectious ectromelia, for example, will live indefinitely in mouse carcinomas. But before this explanation is accepted other well-established facts concerning filtrable tumours must be considered. Some of the tumours which are normally easy to transmit with cell-free filtrates often go into a phase in which it is not possible to obtain an active extract; this phase of "non-filtrability" may last for months. Does the virus disappear when the phase comes on, and reappear when the tumour again becomes filtrable? Or is the virus carried as a "passenger" without a function in the tumour during one phase, only to become a true active tumour-virus when the non-filtrable phase disappears? The subject, as we have already observed, becomes more and more complex and incidentally more and more fascinating. Further work will doubtless settle these issues at no distant date, but in the meantime it is fair to point to the difficulty of believing that the same tumour can at one time be caused by a virus and at

[1] That it can exist in this state is proved by the fact that normal fowls often develop antibodies to the Rous virus.

another time be a mere imitation of a virus tumour. Tumours have such clearly defined and recognisable characteristics that it is hard to believe that any individual one can have multiple causes.

The conventional and most popular explanation of the properties of new growths, is that a tumour cell is a normal cell which has undergone a permanent irreversible alteration of which autonomous multiplication is merely the outward and visible sign. This is essentially the suggestion that a tumour cell is a mutation. The virus hypothesis supposes that a tumour cell multiplies chaotically because of the continuous stimulus provided by an intracellular virus. For some, the minority, of tumours the virus explanation is generally accepted. Whether it has a universal application still remains to be proved.

PERSPECTIVES IN NEUROPHYSIOLOGY

WHILE they are in progress, the researches of physiologists often appear remote from clinical medicine, and this is especially true of investigations into complex subjects like the physiology of the nervous system. A simple yet authoritative exposition of recent progress in neurophysiology is therefore to be welcomed, and Prof. E. D. ADRIAN, F.R.S., provides a valuable one in the July issue of *Science Progress*. After a brief review of the contributions made by anatomy and histology to our understanding of neural function he describes the nature of the messages transmitted by the peripheral nerves and their integration in the spinal cord as elucidated by Sir CHARLES SHERRINGTON. This leads naturally to a consideration of the importance of the synapse between neurones as the probable site of the processes of inhibition and summation of stimuli. The question of what goes on at the synapse is one of the most important of current problems, and the biochemist has already begun to throw light upon it. The first step in this advance was taken when it was shown that adrenaline, by acting on the sympathetic nerve-endings, was capable of producing the same effects as stimulation of the sympathetic nerves themselves. Then followed the isolation of acetylcholine and the discovery that this substance performed a similar function in relation to the vagus nerve. The rôle of acetylcholine however is probably much wider than this, for there is evidence that it is liberated in the sympathetic ganglion when the nerve-fibres leading to this ganglion are stimulated, so that it may play a part in regulating the transmission of impulses across synapses in the sympathetic ganglia. As Prof. ADRIAN says, the chapter dealing with "humoral" transmission in the central nervous system has hardly begun.

He then turns to the remarkable discovery of BERGER that rhythmical changes of electrical potential can be detected by applying suitable electrodes to the human skull and that these discharges originate in the cerebral cortex. These waves, occurring at the rate of about ten a second, are derived from the visual cortex. They are present when the eyes are closed but disappear when they are opened The explanation for this phenomenon offered by ADRIAN and MATTHEWS is that the waves are derived from a rhythmic spontaneous discharge of nerve-cells working at a low level of activity, as in the visual cortex when the eyes are closed. The re-establishment of vision destroys the unison by making different functional demands upon different groups of cells and so abolishes the so-called Berger rhythm. In other parts of the brain, presumably, function is too highly differentiated to allow of a rhythmic discharge being detected in normal circumstances. Nevertheless W. G. LENNOX and his collaborators have already shown that in petit mal an abnormal synchronisation of electrical discharges can be detected in other parts of the brain. Perhaps it is not the province of the physiologist to speculate about the possible applications of his work, but it is not fantastic to predict that the galvanometry of the cerebral cortex will before long come to play as important a part in neurological diagnosis as electrocardiography does in the study of cardiac disease. Mr. GREY WALTER'S paper from the Maudsley Hospital, appearing in our present issue, suggests that it may prove applicable not only to the diagnosis of functional disturbances but also to the localisation of lesions such as intracranial tumours.

If we are to speculate, however, the discovery that chemical substances are concerned in the transmission of nerve impulses seems of even greater potential value. Already the discovery that Prostigmin will temporarily abolish the weakness of myasthenia gravis has suggested the presence in this disorder of an abnormality in humoral transmission at the myoneural junction. The unexplored possibilities of humoral transmission at the synapses of the central nervous system may well throw light upon a variety of disorders. It has long been known that strychnine and tetanus toxin act at this point, and produce a pathological facilitation of nervous impulses. If the opposite process of inhibition is shown to be due to a humoral factor much may be learnt about the nature of sleep, which in PAVLOV'S view is simply widespread inhibition, and about the mode of action of sedative drugs. From a physiological point of view there is reason to suspect that pathological inhibition plays an essential part in producing the symptoms of the depressed phase of manic-depressive psychosis, and excessive facilitation those of the manic phase. Here then is a mental disorder which may yield to increased knowledge of this branch of neuro physiology. At the same time we may soor expect a return of interest in the rôle of humoral factors in the ætiology of the neuroses. There is an increasing recognition of the importance of the constitutional factor in these disorders, and it is clear that this often operates as a limit to what can be accomplished by psychotherapy. The psychological investigation and interpretation of the neurotic patient's symptoms may be true enough at the psychological level, but it may nevertheless be redundant if these symptoms are due to an excess or deficiency of a chemical factor at the synapses of his cerebral cortex.

ANNOTATIONS

THE CERTIFYING SURGEON

THE doubling of the parts of factory doctor and certifying surgeon continues to be matter of complaint and controversy. The Home Secretary was asked last week whether, when appointing certifying surgeons, he would not take steps to ensure that they should not act as medical advisers to the owners of factories or to employers whose men came before them to be certified. The same point was taken later in the day during the debate on the Appropriation Bill when topics within the purview of the Home Office were under discussion. A few days earlier a letter in an Oxford newspaper had given an instance of the possible misunderstanding. A youth, employed in an Oxford factory, had occasion to report to the factory doctor what appeared to be a skin disease. The factory doctor examined him, told him he was suffering from ringworm and advised him to see his private doctor. The private doctor diagnosed dermatitis and this diagnosis was duly reported back to the factory. The youth was then advised to refer his case to the certifying surgeon. He took the advice and paid the prescribed fee of 5*s*. but found that the certifying surgeon was the factory doctor whom he had already seen. The certifying surgeon upheld his own earlier diagnosis (made in his capacity of factory doctor) and refused to give the young man a certificate. The correspondent who sets forth this story in the *Oxford Mail* reasonably observes that the trade unions are liable to harbour unfortunate suspicions that the employer has a better chance of escaping liability where the doctor acts in this dual capacity, and that working people with statutory rights would feel happier if they knew that the certifying surgeon was a different person from the factory doctor. Justice, in fact, as Lord Hewart has more than once declared, must not only be done; it must also seem to be done. The Home Secretary will naturally await the forthcoming report of the Departmental Committee on Workmen's Compensation before laying down any hard and fast rule. But it will be surprising if the committee does not recommend that factory surgeons, who exercise a quasi-judicial function, should be dissociated from any other work in which they may seem to be acting on behalf either of employers or employees.

EAR DISEASE IN THE ARMY

A REPORT on diseases of the ear, nose, and throat in the Army [1] has been made by Dr. Douglas Guthrie in his capacity of aural specialist to the Scottish Command. From this it appears that two groups of diseases, tonsillitis and middle-ear suppuration, far outnumber all others. Tonsillitis is one of the principal causes of admission to hospital, and therefore of inefficiency and loss of working days, and it appears to be commoner under Service conditions than in civilian life. But it is not a cause of permanent unfitness, for the patient is cured by competent removal of the tonsils. Middle-ear suppuration is on a very different footing; although it ranks fairly low as a cause of admission to hospital, it forms about one-fifth to one-third of the patients seen by the aural specialist, and it ranks second only to tuberculosis as a cause of invaliding. The cases of acute otitis must be separated as the prognosis is good in most of these; but in Dr. Guthrie's experience the great majority of sufferers from chronic suppurative otitis, or of its sequelæ such as scars, perforations, and deafness, are unfit for military service. Fortunately, owing to greater care in the examination of recruits, and to more thorough treatment of the disease, it appears to be less common in the Army now than formerly. It is therefore a matter of the utmost importance that it should not be overlooked, for much time and money may be lost to the country by the acceptance and subsequent rejection of unsuitable recruits. Disease of the middle ear, usually chronic suppuration and its sequelæ, is the principal cause of unfitness in recruits and accounts for the rejection of 50 to 60 in every 1000 who apply for enlistment. The tympanic membrane must be inspected in every recruit after the removal of any wax; and the hearing for voice and whisper must be tested, for such conditions as concussion-deafness and otosclerosis may be present with a normal drum. The presence of a perforation, even if dry, should lead to rejection, as it may become a gateway of reinfection under stress of service conditions. An intact tympanic membrane and good hearing should be considered essential in every candidate for military service.

[1] Jour. R.A.M.C., July, 1936, p. 36.

THE "SAFE PERIOD"

THE theory that there is a "safe period" in the menstrual cycle during which conception is unlikely—if not impossible—is founded on clinical and experimental evidence that ovulation usually occurs about the middle of a normal cycle. For practical purposes it may be said to occur at some time between the thirteenth and sixteenth days of regular cycles of about 28 days' duration, cycles being counted as the interval between the first day of one menstrual bleeding and the first day of the succeeding bleeding. If the liberated human ovum resembles other mammalian ova in surviving only for a few hours, fertilisation, to be effective, must occur close to the time of ovulation. Experimental work suggests that sperms lose their power to fertilise within 48 hours after they are exposed to the normal temperature of the female reproductive tract. Taking these findings together, the conclusion is reached that coitus will prove fertile only between the eleventh and seventeenth days of the cycle. This is the period of fertility defined by H. Knaus; K. Ogino gives it wider limits, believing that conception is occasionally possible in the earlier days of the cycle. The last 8 to 10 days of the cycle are regarded as absolutely infertile by most workers.

Three recent contributors to the mass of literature on this fascinating subject, Prof. Paul Delmas of Montpellier,[1] Dr. V. C. Pedersen of Columbia,[2] and Dr. C. Hartman of Baltimore,[3] are firm supporters of the existence of a safe period, though none brings forth any new arguments. Delmas presents his views with grace, but neither cites the facts on which his conclusions rest, nor refers to the opinions held by opponents of the theory; he falls into the error of giving credit for the discovery of the time of ovulation in women to the Japanese worker Ogino,

[1] Rev. Franc. de Gynec. et d'Obst., February, 1936.
[2] Nature's Way of Birth Control. By Victor Cox Pedersen, M.D. Columb., F.A.C.S. London: Williams and Norgate Ltd. Pp. 99. 3*s*. 6*d*.
[3] Time of Ovulation in Women. By Carl G. Hartman, Department of Embryology, Carnegie Institution of Washington, Johns Hopkins Medical School, Baltimore. London: Baillière, Tindall and Cox. 1936. Pp. 226. 13*s*. 6*d*.

whose observations of ovaries exposed at laparotomies were in fact made many years after those of the famous German gynæcologist L. Fraenkel. The only original part of Pedersen's book is a table in which the recommendations of Knaus and Ogino (to whom he repeatedly refers as "masters") are combined. This table is intended to guide women whose menstrual cycles vary between 21 and 40 days as to which phases of the cycle they may regard as fertile and which sterile. All variations in the length of the cycle are here attributed to variations in the length of the pre-ovulation phase, a post-ovulation phase of 15 days being regarded as constant. Success in spacing pregnancies is boldly claimed for 95 per cent. of women who use this method, but unfortunately Pedersen does not say for how long the women upon whose experiences this calculation is based have used it. Success over 6 months, a year, or 10 years would mean very different things. Hartman, in contrast to Delmas and Pedersen, approaches and executes his task in the manner of a hard-hitting experimentalist. Entrenched behind a structure of laboratory observations he sweeps aside as unreliable such clinical evidence as is incompatible with the physiological conditions necessary for the "safe period." His attitude is particularly relentless towards reports of pregnancy occurring after coitus during what should have been, on the hypothesis of the "safe period," an infertile phase of the cycle, for his faith in the fallibility of human, and in particular feminine, testimony is as unshakable as is his confidence in the value of data derived from laboratory studies.

BOOKS FOR SANATORIA

WHILE some attention is being given to the provision of books for patients in hospitals the more important need of patients in sanatoria has not received the same consideration. It was forcibly brought to the notice of a recent conference of Welsh library authorities at Aberystwyth by Mr. W. Williams, keeper of the printed books in the National Library. He pointed out the fundamental difference between the two types of patients. The patient in hospital has the right to demand the facilities of the public library service while the patients in sanatoria cannot do so because they are not in the position to fulfil the requirement to return the books. Wales has a national association for the prevention and abolition of tuberculosis which deals with over 28,000 patients annually. There are seventeen institutions with over 1500 beds and eight clinics under its control, but owing to the long waiting-lists the council of the association finds it necessary to rent something like 150 beds in outside institutions. The bulk of the income of the association, amounting in 1935 to £232,500, is received from the councils of the counties and county boroughs of Wales and Monmouthshire. The income only provides for necessities and does not allow a margin for amenities which mean so much in the lives of the patients and their restoration to health. Among these amenities books are perhaps more important than any other. The National Library of Wales tries to make an equitable distribution of those placed at its disposal, but a far larger and more continuous supply is required. Five appeals made through the press and by wireless during the past three years produced about 6000 volumes of which 3970 were suitable and were distributed between seventeen institutions with a total complement of 1517 beds for patients. That means, as Mr. Williams pointed out, that rather less than one book per bed per annum has been received at each sanatorium. Such a result he was unable to regard as satisfactory and advocated the formation of a central council to collect and distribute the books, with the libraries throughout the principality as receiving depôts. It is possible that the formation of a body of friends of the Tuberculosis Association might enlist the assistance of patients and their relations, who know the needs and have the means to relieve them, to come to the aid of those who have not in the same way as the Diabetic Association has enrolled the coöperation of fellow-sufferers.

RESULTS OF TREATMENT OF TIBIAL FRACTURES

THE period of disability and the proportion of cases of permanent invalidity associated with different types of fracture of the shaft of the tibia and different methods of treatment have been the subject of investigation by A. Lundgren.[1] He has studied 389 insurance cases of fracture of the shaft of the tibia (with or without the fibula) treated at five large Swedish hospitals between 1918 and 1929, and he supports the conclusions he has reached by a large number of references to the literature. The average age in this series of fractures was rather high—38·6 years; this fact, as Lundgren points out, must have influenced the results unfavourably, as the frequency of invalidity shows a pronounced rise with advancing years. 302 of the cases were uncomplicated, and of these more than half were oblique or spiral; about a quarter were transverse and a quarter comminuted. Among the compound fractures comminuted and transverse types predominated.

The average stay in hospital was for the entire series 81·1 days, for the uncomplicated cases 64·7 days, for the compound fractures 138 days. The corresponding periods of incapacity for work were 210·6, 170·4, and 349·6 days. Invalidity developed in 22·1, 16·2, and 42·5 per cent. respectively. It is not stated whether any of the cases were treated by the ambulatory method, but from the duration of stay in hospital it appears that all were kept in bed for a considerable time. Treatment of the uncomplicated fractures was by reduction and plaster in 149 cases; in a further 73 treated in plaster no reduction was necessary, the position being good from the outset, and as the author points out, unless this group is considered separately it may influence the results in a misleading way. Extension was used in 22 cases, operation in 58. Treatment of the compound fractures was by excision and suture of the wound without operation on the bones in 73 cases; with operation on the bones in 16.

The anatomical position, as has been shown over and over again, has a vital bearing on the result. The period of disability with a good position was 130·3 days, with a moderately good position 200·1 days, and with a poor position 339 days. The corresponding figures for frequency of invalidity were 4, 28·3, and 76·9 per cent. Transverse fractures took longer to heal than spiral ones; comminuted fractures yielded worse results than either. The conclusions reached are as follows: for simple oblique and spiral fractures primary operative treatment seems to give somewhat better results. The method advised is fixation with screws. Transverse fractures should be treated by reduction (if necessary) and plaster; if this fails, by extension; and by operation only after repeated failures to obtain a good position. For comminuted

[1] Acta Chirurgica Scandinavica, 1936, lxxviii., Supplement xlii.

fractures the best treatment is held to be reduction and plaster, or wire extension. Operation should be done only in exceptional cases. Compound fractures which come under treatment within eight hours should be dealt with by excision and primary suture of the wound, reduction of the fracture, and fixation in plaster; if necessary by wire extension. The results obtained in this way seem to be somewhat better than by simultaneous operation on the bones.

AMINO-ACETIC ACID FOR ANOREXIA

THE fact that most of the myopathy patients under his care reported a gain in weight and a stimulation of the appetite after treatment with amino-acid therapy led Dr. Howard A. Beard[1] to study the effect of this therapy in otherwise normal individuals who complained of anorexia, under-weight, and nervousness. None of the patients studied had put on weight or increased their appetites on any previous dietary or medical régime. Amino-acetic acid was given in 10–20 g. daily doses in water, milk, or fruit juices for three to twelve weeks to eight patients, whose increase in body-weight after treatment varied from 7 to 24 lb. In one patient whose under-weight was associated with hyperchlorhydria and asthenia treatment was continued for 24 weeks, the patient gaining 13 lb. In all cases the anorexia, nervousness, and fatiguability are said to have disappeared and strength was increased. The ages and sex of the adult patients are not stated, but it is recorded that the treatment was also tried with considerable success in the department of pædiatrics at the Louisiana State University Medical Centre on 15 children who would not eat a sufficient amount of food for their body's needs.

THE LEAGUE OF NATIONS AND NARCOTIC DRUGS

THE last report of the Advisory Committee on the Traffic in Dangerous Drugs to the Council of the League of Nations is of unusual interest. It records with satisfaction the progress in effective control over the legitimate manufacture of narcotics and reveals "the alarming situation in the Far East" for which "a remedy has yet to be found." Little advance appears to have been made towards drafting a convention to control the cultivation of the opium poppy and the harvesting of the coca leaf. The information invited by a questionnaire issued by the Secretariat of the League in 1933 is said to be "still very incomplete." The Turkish Government "did not admit the urgency for an international agreement restricting its liberty of action in this matter" while the Iranian representative "did not think that the problem was yet ripe for practical consideration." The representative of China, another large producer of opium, favoured the convening of an international conference with a view to draft a convention to limit the cultivation of the poppy, as this would be "a great encouragement to the Chinese Government in accordance with their six-year plan of suppression." It was, however, strongly urged in the committee that "the proposed conference should not be indefinitely delayed owing to lack of information from the producing countries." The committee finally adopted a resolution to dissociate the question of the control of the coca leaf from that of the limitation of the cultivation of the opium poppy. The committee, while reiterating the conviction that "measures of controlling cultivation of the opium poppy are urgently needed," postponed to its next meeting the examination of the principles which might serve as a basis for a convention and the appointment of a preparatory committee for the purpose of drawing up a preliminary draft convention. Meanwhile the governments of the producing countries are to be requested to furnish by Jan. 31st, 1937, the information for which they were asked in the questionnaire of 1933. As regards the situation in the Far East the committee reported "an enormous production of opium, clandestine manufacture, and widespread illicit traffic in narcotic drugs, the manufacture and traffic being carried on in part by foreigners, principally Japanese and Koreans, living under extra-territorial jurisdiction" in China and liable to penalties which could only be described as derisory. This state of things is the more inexcusable seeing that under chapter iv. (articles 15–19) of the Hague International Opium Convention of 1912 the Treaty Powers, with colonies and leased territories and concessions in China undertook to restrict the use and illicit import of narcotics into such territories. The Chinese authorities are struggling to effect in their six years the suppression of opium-smoking and the cultivation of the poppy, and with Draconian severity had executed 970 persons during the year 1935 for breaches of narcotic laws.

[1] American Medicine, June, 1936, p. 340.

THE L.C.C. MENTAL HOSPITALS AND G.P.I.

THE London County Council passed a resolution in February last suggesting that its mental hospitals committee should prepare a report on general paralysis and the modern treatment of syphilis as shown by the cases admitted to the Council's mental hospitals during the three years 1932, 1933, and 1934. Since 1924, when a malaria laboratory was established at Horton, that hospital has undertaken the treatment of most of the female cases of general paralysis from all hospitals. In 1931 it opened a special treatment centre for male general paralytics and in 1935 it received 61 per cent. of the total cases. The diagnosis has been confirmed by clinical symptoms, post-mortem findings, and serological tests of the cerebro-spinal fluid. The medical superintendent has compared the records of 113 men admitted between 1912 and 1914 with an equal number admitted after 1932. The symptomatology seems to be much the same, manic and depressed types being rare in comparison with grandiose and dementing. The recent records show a larger proportion of confused cases, but this may be partly due to the difficulty of distinguishing between confusion and dementia. Even nowadays patients are still admitted in an advanced stage when treatment is almost hopeless, and there is still room for earlier diagnosis. The report states definitely that before the advent of modern therapy there was no real recovery from general paralysis; the death-rate was 86·8 per cent. and the discharge rate only 3·4 per cent. although it included ill-advised withdrawals by relatives. On an average the patients lived between one and two years after admission. The comparative figures for the recent years show a discharge rate of 19·8 per cent. and a treatment rate of 85 per cent., the death-rate having been reduced to 40·8 per cent. In most cases the cure is permanent and many of the discharged are now successfully filling positions of responsibility. The best results recorded indicate that of all cases admitted modern therapy can yield a recovery rate of 25 per cent., and a death-rate reduced to 30 per cent. The inquiry also revealed a definite decrease of general paralysis since 1930. One reason for this is earlier diagnosis, leading to

treatment in general hospitals and other institutions. The tendency is for the mental hospitals to receive the patients who have failed to respond to treatment elsewhere.

THE CIRCULATION DURING SPINAL ANÆSTHESIA

THE symptoms of shock manifested by patients within a few minutes of an endothecal injection is familiar to all who frequently employ spinal anæsthesia. Although all agree as to the symptoms, different explanations are offered to account for them. Oscar Schuberth (Acta Chirurg. Scandinav., vol. lxxviii., supplement xliii.) has endeavoured to solve the question by experiment. First he briefly reviews the current theories of shock and collapse and, while admitting that the term shock means different things to different people, decides that the essential element of the condition is peripheral circulatory insufficiency. When occurring during spinal anæsthesia he finds that this must be brought about either by paresis of vasoconstrictor nerves, or else by primary respiratory disturbance with secondary circulatory derangement. With regard to the latter it may be said at once that he concludes that there is no support for the view that fall of blood pressure in spinal anæsthesia is secondary to intercostal paresis. He finds that the tidal air in spinal anæsthesia encompassing the greater part of the thoracic cord is subjected to no change owing to paresis of intercostal muscles. The blood pressure fall is not, then, secondary to respiratory depression. Examining its features experimentally Schuberth concludes that it is shock which differs from other forms of the condition in that this shock is not accompanied by decrease in blood volume. The circulating blood volume, plasma volume plus red cell volume, suffers no change in connexion with spinal anæsthesia. There is, however, some diminution in cardiac output. Clinical experience has always suggested that there was some essential difference between spinal anæsthesia shock and that caused in other ways, for the former in spite of its apparent danger was almost invariably followed by recovery. There is much in Schuberth's work to confirm the optimism of those who have consistently ignored the "shock" which sometimes accompanies endothecal injection.

RATING OF HOSPITALS

IT often happens that when a voluntary hospital is enlarged or improved its assessment for rates makes a big jump upwards. Yet as a rule the only people who gain any profit, pleasure, or privilege from the provision of additional facilities are the patients for whom the hospital exists. At its meeting on July 22nd the Sussex regional committee of the British Hospitals Association presented some illuminating figures showing how the work of voluntary hospitals is penalised by the burden of rates in its county. The schedule submitted had reference to 28 hospitals covering the whole of Sussex: from only 1 small institution had no return been made. This schedule showed that in those 28 hospitals there were 1656 beds, and the total net assessment reached the large figure of £11,825, or £7·13 per bed. Comparative figures from adjoining counties of hospitals providing 1574 beds gave an average assessment of only £3·64 per bed; the hospitals included comprised those in Canterbury, Deal, Folkestone, Dover, Maidstone, Tunbridge Wells, Guildford, Winchester, Portsmouth, and Southampton. Whereas the Royal Sussex County Hospital at Brighton, with 272 beds, was mulcted in an assessment of £1987, or £7·30 per bed, comparable hospitals in Southampton and Portsmouth were called upon to pay on an assessment of only £2·50 and £2·80 per bed. It is evident that Sussex assessments are very high, and it would be interesting to learn how the rating authorities of the county arrive at their figures. It may be that these are based on the value of the buildings to a hypothetical tenant; but while a hospital remains a hospital it seems only reasonable that municipal demands upon it should be nominal. The provision of hospitals on a voluntary basis brings direct relief to the ratepayers and there will be many to agree with the Sussex committee that high assessments are an unsatisfactory expression of the gratitude that might be expected. The governors of these institutions are getting tired of this unreasonable and increasing handicap to their work.

ÆSCULAPIUS IN RUSSIAN UNIFORM

Sir Farquhar Buzzard told the British Medical Association a fortnight ago that "the war against disease has been conducted on a wasteful and ill-organised system," and referred to "a badly organised service, such as that which has evolved in this country during the last century." All will agree that medical knowledge and skill could give better results if it were better applied—that organisation is one of its primary needs. The claim is often made that they do these things better in Russia, and in our present issue a special correspondent is able to give some account of the Russian equivalent of the "health centres" that Sir Farquhar would establish in England for the salvation of family practice. The greatest difference between the two models is that the Russian health centres are staffed by salaried doctors, not by private practitioners; and some will feel that rationalisation is bought at too high a price if it means regimentation. The question arises, how far is Æsculapius really hampered by going into uniform? Is he incommoded by boots and spurs and memoranda; or does he heave a sigh of relief when he puts away the top hats and calling-cards of civilian life and settles down to work in comfortable clothes? Our correspondent has looked for an answer in the Soviet Union.

INDEX TO "THE LANCET," VOL. I., 1936

THE Index and Title-page of Vol. I., 1936, which was completed with the issue of June 27th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

TUBERCULOSIS IN CYPRUS.—As we have already announced, the National Association for the Prevention of Tuberculosis are coöperating with Dr. Neff, chief medical officer of Cyprus and the local health authorities, in an anti-tuberculosis campaign in the island. It is hoped to make a study of the incidence of the disease and of its mortality and to assist the public health administration to establish a comprehensive scheme for its prevention and cure. As medical commissioner for the campaign the association have appointed Dr. Noel Bardswell, who is retiring from his post as officer-in-charge of the tuberculosis section of the public health department of the London County Council, and he will sail for Cyprus in October. Mrs. N. Jays, S.R.N., of the Seamen's Hospital, Greenwich, who speaks Greek fluently, has been appointed nurse commissioner, and will accompany him.

PROGNOSIS

A Series of Signed Articles contributed by invitation

CX.—LUMBAGO AND SCIATICA

WHEN attempting to consider the prognosis of lumbago and sciatica, one is faced by difficulties arising from the fact that these terms have been used very loosely, and often indicate a symptom rather than a disease. This statement applies in particular to sciatica, which implies pain in the course of the sciatic nerve irrespective of cause. Some reference must, therefore, be made to differential diagnosis before the question of prognosis can arise.

Lumbago

Lumbago should be accepted as a condition of fibromyositis of the lumbosacral region occurring in acute or chronic form. Chronic lumbago almost always follows a series of acute attacks. Primary chronic lumbago will usually be found to be due to some structural disease of the spine.

Acute lumbago comes as a bolt from the blue. At one moment in good health, at the next the victim is stricken with a piercing pain in the back which holds him in a position of agonised rigidity. Any attempt to straighten the back produces unbearable pain. The muscles in the affected area are diffusely tender, but as a rule one spot can be discovered at which deep pressure produces exquisite pain. What hope can we hold out of a rapid recovery? Prognosis must necessarily be affected to some extent by the view taken of the ætiology, which must influence treatment. Whatever may be said of the influence of focal sepsis in the production of various rheumatic manifestations, in most cases no connexion can be demonstrated between lumbago and sepsis. It is more or less generally accepted that fibrositis of this type is due to a local failure of circulation to remove the waste products of muscular contraction. This may account for the influence of a draught on the back in precipitating lumbago. The painful nodules which can be felt in the affected muscles do not represent septic emboli. If they did, treatment by massage and exercise could only aggravate the condition. An excised rheumatic nodule in the early stages may show no recognisable difference from the normal surrounding structures when examined microscopically; nevertheless the nodule is a very real thing and produced by the formation of local coagula, or gels.

Given correct treatment, acute lumbago can be expected to clear up in three days to a week. The principle of treatment is to encourage dilatation of the blood-vessels in the affected area. On the rare occasions when the patient has sufficient courage to perform vigorous spinal exercises in spite of pain, great and sometimes complete relief is obtained in half an hour. As a rule, however, one must rely on other means, the most effective of which is thorough muscular kneading two or three times daily. Subsequent to this deep massage, movement is always easier and should then be encouraged in the form of brisk spinal exercises for a short period. Thereafter prolonged heating with a thermo-pad, or with very hot water bottles, and rest in bed will obtain the quickest results. There is no evidence that diathermy is in any way superior to the simple therapeutics outlined above. The use of analgesics such as aspirin may, however, favourably influence the course of the disease, not by virtue of any specific action against rheumatism, but because, by relief of pain, they allow the all-important active movements of the trunk. Even if sepsis, gout, constipation, or any other of the variety of possible ætiological factors be present, their eradication in no way affects prognosis of the immediate attack. On the other hand, alcohol is definitely harmful, particularly in the form of champagne.

The most favourable prognosis may be completely upset by the development of sciatic pain after a day or so of pure lumbago. This by no means uncommon event immediately takes us to the prognosis of acute sciatica, to which reference is made below.

Chronic Lumbago.—Chronic lumbago, which tends to follow on a series of acute attacks, is characterised by constant discomfort and stiffness in the back, giving place from time to time to short outbreaks of acute pain. In such cases limitation of mobility of the spine can always be observed, and it is probable that the condition is a sequel to the formation of adhesions derived from the earlier bouts of fibrositis.

Before considering the prognosis of this relatively simple type of the disease it is necessary to emphasise the importance of differential diagnosis. The commonest demonstrable organic disease mistaken for chronic lumbago is osteo-arthritis of the spine. That this is the cause of the pain is all the more probable if chronic backache has developed without a history of acute lumbago. On the other hand, many persons having osteo-arthritis of the spine do in addition suffer from recurrent attacks of true lumbago. It is, therefore, a matter of no small difficulty to decide how much of the discomfort is due to the one or to the other. Moderate lipping of the vertebræ must not be regarded as evidence of osteo-arthritis. It is found in most people over the age of fifty. If the changes are gross then, although there can be no objection to deep massage and controlled spinal exercises, anything in the nature of forcible manipulation is inadvisable. From what has been said it is clear that no patient with apparent chronic lumbago should be treated before X ray examination of the spine. Incidentally this will also help to avoid such pitfalls as the by no means uncommon osteitis deformans and the more serious lesions such as new growth.

The outlook for a case of chronic lumbago with relatively healthy spine is good. All that is needed is manipulation of the back under anæsthesia followed by deep massage and active spinal exercises. Complete recovery is the rule in two months. Here, of course, attention to the general health is a matter of great importance, in particular to reduction of excessive obesity, exercises to correct a pendulous or protuberant abdomen, elimination of dental sepsis (if undoubtedly present), and last but not least determination of the blood uric acid. Many of these cases have a gouty basis, and if the uric acid content of the blood is 5 or more milligrammes per 100 c.cm. treatment as for gout should be instituted.

The prognosis of chronic lumbago with spinal arthritis must be guarded. Some help can be obtained from physical treatment and the underlying arthritis may be relieved by deep X rays, but full recovery and freedom from further attacks is not to be expected.

Remote Prognosis.—Can we give an opinion as to the likelihood of further acute attacks? In general this is possible. Although lumbago may appear in an apparently normal person, the appearance of

health is usually superficial, unless some obvious cause such as prolonged gardening, plus sweating, plus a cold wind, appear as immediate precursors. The most potent predisposing cause of acute lumbago is the rather vague condition of being "run down." Fatigue, constipation, focal sepsis, lack of exercise demanding spinal movements, and daily alcoholic drinks all tend to lower vitality, especially in the winter months. It behoves us, therefore, to inquire fully into the habits of our patient, for by the giving of sound advice one can almost always be instrumental in preventing further attacks, at any rate of frequent ones.

Sciatica

What is commonly called sciatica may be either sciatic neuritis or central sciatica.

(1) *Acute Sciatic Neuritis.*—It would be better if the term "sciatica" were reserved for this condition. Here we have a unilateral pain in the course of the sciatic nerve associated with tenderness of the nerve at various points, diminution or loss of ankle-jerk, a similar modification of sensation especially on the outer side of the foot, sole, and ankle, acute pain on stretching the nerve, and often some loss of power in the leg muscles, especially those producing dorsiflexion. With great frequency sciatic neuritis follows acute lumbago, and presumably the same "rheumatic" process is responsible.

First and foremost organic disease simulating sciatica must be excluded. No case of sciatica has been adequately examined without an X ray being taken of the lumbosacral spine, pelvis, hip-joint, and upper half of the femur. Neither may a rectal examination nor general overhaul be omitted. Any patient with sciatic pain in both legs must be suspected of a central—e.g., vertebral, spinal, or pelvic—disease, not forgetting the very real possibility of a cauda equina tumour. In short, if all other investigations in such cases prove negative, examination of the C.S.F. is imperative before accepting the diagnosis as one of bilateral sciatica.

Sciatic neuritis having been established, the prognosis is six weeks in bed and another four weeks before return to any hard physical work. If the patient is prepared to stay completely at rest, lying flat on the back with the limb immobilised by means of sand-bags and towels, recovery usually follows. The less active the treatment, the more rapid the recovery. Diathermy, manipulation, injections, or stretching the nerve can only do harm in acute cases. There is no such thing as a dramatic cure of true acute sciatica. In the minority of cases complete rest, although easing the acute pain, fails to effect fully a cure. There is persistent pain with certain movements, and a tendency to spontaneous discomfort from time to time. The condition is now merging into that of chronic sciatic neuritis.

(2) *Chronic Sciatic Neuritis.*—Assuming once again that general causes such as gout, gross focal sepsis, and constipation have been dealt with, the usual explanation for the persistence of sciatica is the presence of adhesions between the nerve and the surrounding structures, and the nerve sheath and its contained nerve bundles. Another cause is the persistence of the lumbosacral fibrositis which often initiates the attack. If evidence of lumbago be still found treatment must be directed to this area. Failing this the stage has been reached for stretching the nerve under anæsthesia (not by open operation) and its injection with saline.

If these measures produce prompt relief, as they do in rather less than half of those treated, the prognosis is excellent and complete recovery follows in a few days. One important proviso is that in every case of sciatica, or for that matter of lumbago, the posture must be returned to normal if recurrences are to be avoided. Scoliosis tends to persist as a faulty habit. It can be corrected in a few weeks by suitable exercises if tackled at once. If active treatment of chronic sciatica fails, prognosis is uncertain. All one can say is that nearly every case recovers in six months to a year.

Central Sciatica.—This term denotes a condition in which sciatic pain is felt down one limb, but in which the cause is a lesion of indeterminate nature in the region of the lumbosacral vertebræ. It does not include therefore gross lesions such as malignant deposits or fractures. The signs differ from those of sciatic neuritis in that the ankle-jerk is seldom affected, or at the most slightly depressed, there is no nerve tenderness, and any sensory loss is slight and usually limited to the extreme outer border of the foot. On the other hand, there is usually tenderness of the erector spinæ close to the corresponding sacro-iliac joint, tenderness over this joint, or limitation of movement of the lower spine. The two common causes are strain and recurrent fibrositis of the lumbosacral region.

(1) Acute central sciatica is usually due to strain either as the result of sudden trauma or from prolonged semi-recumbency without support to the small of the back.

(2) The chronic form is usually the result of chronic lumbago, the rheumatic process extending ever deeper into the spinal muscles and fasciæ and ultimately causing irritation of the issuing nerves.

The part played by sacralisation of the fifth lumbar vertebra is probably of little importance. This condition implies abnormal development and therefore inherent weakness of the back. The spine will thus be more prone to the effect of abnormal stresses than is a healthy structure. Sacralisation is thus found in a higher percentage of chronic sciatics than can be accounted for on chance coincidence.

Acute central sciatica when due to strain provides opportunity for dramatic cure. It is here that a single manipulation may banish a pain which has been present for weeks previously. In chronic central sciatica the prognosis is also good. Complete recovery can be expected in anything from a few days to three months. The length of time depends upon the initial stiffness of the back, the degree of postural scoliosis, and the length of history. Manipulation of the spine, deep massage, exercises, and epidural injection of saline are the right measures to adopt. If these are carried out adequately complete recovery can be anticipated in over 80 per cent. of cases.

Remote Prognosis.—As to the chances of further attacks the same precautions must be taken to correct any deviation from normal health, but in addition, as with lumbago, unceasing attention should be devoted to spinal movements and correct posture. Chronic backache and chronic central sciatica are essentially diseases of the middle aged. They are bound up with the entirely unnecessary increase of girth and decrease of spinal movement common to this age. Physical sluggishness takes its toll of the muscular and skeletal system insidiously but remorselessly. There are few conditions in which the doctor can so actively improve prognosis as in those we have discussed.

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SPECIAL ARTICLES

RUSSIA TO-DAY

MEDICINE UNDER SOCIALISM

(FROM A SPECIAL CORRESPONDENT)

I

YOU are in Moscow. An ulcer has perforated; or, as is all too probable, you have been hit by a motor-car. What happens?

At the Sklifassovsky Hospital for First Aid (700 beds) a doctor is always waiting at the telephone. As soon as he is satisfied that the need is urgent he will order an ambulance either from the hospital or from one of four other stations in the city. On the instrument beside him five signals will record the execution of his order: the first light means that the message is received; others that a doctor, his assistants, and the chauffeur have gone to the car; and the fifth (from the watchman at the gate) that the ambulance has actually left. A dial shows the passage of time from the moment of the order; the total is usually about 1½ minutes. At the hospital itself 13 ambulances are always on call, each carrying a doctor, an assistant doctor with three years' training, and a relatively unskilled helper. The average number of calls is 160–170 a day, and as the work is professionally uninteresting it is divided among 70 doctors who take duty for 24 hours at a time so as to be free for hospital practice four days a week. The telephonist works a 4-hour shift and the assistant doctors an 8-hour day with every fourth day free. At night there is always a psychiatrist at hand to go out with the ambulance.

On arriving at the hospital the patient, if his skin is broken, gets an injection of anti-tetanus serum. He then passes into the care of the internal staff, among whom a surgeon, a gynæcologist, a radiologist, and a general physician are always on duty. Sets of instruments required for various operations stand ready for use. Tetanus never develops; the hospital has records of 32 heart wounds successfully sutured; and among 230 cases of perforated ulcer admitted last year the fatality-rate was only 8 per cent.

I give these details of a particular hospital because they illustrate some of the advantages of a central medical organisation. In the first place the Moscow ambulances do not (as lately in London) feel obliged to set down their freight inside borough boundaries. Secondly, means have been found to staff them with doctors rather than orderlies. Thirdly, they bring the patient—unless he is too ill to travel so far—to a hospital which is eager and able to treat him without a minute's delay; a hospital where specialists are on duty and operating theatres prepared. If we have nothing to learn from this, well and good. But to me it seems a suitable example of the way in which Russian medicine, starting with certain administrative advantages, has been able to make better use, in some directions, of knowledge we all possess. Medical training and skill and equipment may not be specially good in the Soviet Union, but the authorities are making unparalleled efforts to apply them immediately and effectively. The new State cannot afford unnecessary invalids, and money is not grudged if it will help the citizen to be healthy or will reduce his disability.

The outlook, as might be supposed, is primarily preventive.

BEGINNING AT THE BEGINNING

In Moscow and elsewhere (before being run over) the visitor will notice huge pictures showing Stalin at the centre of a group of cheerful children. Boys and girls in the Soviet Union to-day are expected to be grateful to Comrade Stalin for the fact that they live in the country that is best in the world for children.

This propaganda is founded on fact. Rich or poor, legitimate or illegitimate, the Russian child has unusual care and unusual equality of rights and opportunities. The Soviet Union is a country of young people—40 per cent. of the population have been born since the Revolution of 1917—and the object of the Government is to mitigate for children and adolescents the effects of shortage, especially shortage of houses and labour. One result of this is the astounding development of creches: if the Russian mother is encouraged to work at a factory she is also given a chance to leave her family in good hands during working hours. The creche system, it is argued, is no more unnatural than the employment of nursemaids; the children are the better for a social life and the parents enjoy them more if they do not have to contend with them all day. So there are creches at factories, creches at railway stations, creches on trains.

What is less familiar, perhaps, is the use made of open spaces in the cities. The Russian "parks of culture and rest" are far more amusing and pleasing than their name implies, but nothing even in the Moscow park is half so good as its "children's townlet," where hundreds of children spend long days of summer. Here are all manner of games and entertainments: when the child is tired of climbing or dancing and of combats on rotating wooden horses he may try his hand at sculpture or painting, or learn how to make model aeroplanes and lifts and engines, or go for a shower-bath, or a row on the lake, or up the hill to the biology house to play with the rabbits or work in the gardens. I do not know how this place is run, but I do know that it is essentially right for city children. Nor should one despise the smaller play centres in smaller parks or smaller towns, where parents sit peacefully watching their offspring's feats on climbing frame, wooden roller, rocking-boat, steps, bars, and other aids to the dangerous life. And for the winter there are buildings like the vast Palace of the Pioneers[1] in Kharkov, where all can enjoy the advantages—from playrooms to laboratories—which few can afford for themselves alone.

REPAIRS UNDER STEAM

More specifically medical are the day sanatoriums (sometimes called preventoriums) for children who need special care. The one I saw at Kharkov occupied part of a large fir wood which is one of the city parks. Early every summer morning, except on Rest Days,[2] you may see 600 children, aged 7 to 14, arrive in reserved tramcars to spend the day under medical auspices, and during the four months' season, which covers the school holidays of two and a half months, about 2000 go through the woodland regimen. Some are sent, and paid for, by their parents; they

[1] Pioneers roughly correspond to Boy Scouts and Girl Guides.

[2] The urban population of the Soviet Union generally work a 5-day week and rest on the 6th, 12th, 18th, 24th, and 30th of the month. In the countryside, with its longer hours, they still recognise the former days of the week and take their Rest Day on Sunday.

usually stay thirty days: others come from dispensaries and clinics and stay forty. Mostly they are "run down," convalescent, or nervous, but some are admitted because they are exposed at home to tuberculous infection. The medical staff consists of two doctors and four dentists, working under a half-time medical director; like the teaching staff they are employed in schools during the rest of the year. No special methods of treatment are adopted, and even formal sun-bathing has been abandoned; but the average gain in weight is 6½ lb. in forty days. This is how it is arranged:—

The children, arriving from 7.30 A.M., are met at the gate by a doctor who looks for sore-throat or other infection. Each has a bag into which he puts his home clothes, and by 8.30 all are ready for physical exercises, a wash, and breakfast—e.g., bread and butter, macaroni cheese, meat, and milk. (Some have already had food at home). After an hour's rest they go to a medieval wooden fortress for showers (warm at first) and then have lessons in little shelters. Lunch at 1 P.M. (borsch, cutlets and potatoes, and raspberries) is followed by a couple of hours' rest out of doors. At 5 P.M. there is "milk and a bite" (e.g., cheese dumplings) and then there are organised games for an hour. Once in the 5-day week there is a cinema show, and sometimes there is a concert, or a play by actors from the local theatres. Some of the children learn drawing, while others make mechanical models: as I left a visiting musician was waiting under the trees with his accordion. At supper there is, maybe, a cereal with jam or fruit: the total milk intake is two or three glasses a day. At 7 the boys and girls go marching off to the trams, singing as they go.

SANATORIUM AND HOSPITAL

Closer to English types was another sanatorium in a pine wood a few miles out of Kiev, where tuberculous, pretuberculous, and nervous children of 2–7 spend two or three months at a time, alike in summer and winter. What was particularly impressive about it was the way in which the institutional atmosphere had been combated. Small aquariums (like statues of Lenin) are a commonplace of clinics in Russia, but here the fish were only one of many means of making the child take to his new environment and of keeping him happy. Parents are not allowed as visitors because their arrival upsets the child's equanimity; but "we are able to show them photographs of their children almost every week." A similar thoughtfulness was displayed at the smallish hospital in Kiev to which I was taken by the chief medical officer of the city. In the hall were three telephone cabinets from which visitors could speak to their friends in the wards when an encounter was undesirable. By every bedside was: (1) a bell for summoning assistance; (2) a light showing that the bell had been rung; (3) a point for electric light; (4) a point for the telephone; and (5) a point for wireless earphones. Here again much had been done to make the patient feel at home; and I suspect that rules and regulations play a less distressing part in Russian hospitals than in English. Certainly the surgeon of the Soviet ship—speaking from sailors' reports on their relative comfort—had no doubt about the difference. He seemed to think that in England we leave too much to the nurses.

AFTER THE CHILD—THE WORKER

I shall attempt no description of the remarkable development of rest houses, holiday camps, and health resorts throughout the Soviet Union, nor of the spread of physical culture and athletics. Enough has been said to show that both preventive and reparative measures are thought exceedingly important. Something must, however, be added about one of the most vital links between preventive and clinical medicine in Russia—namely, the factory clinic.

On visiting the "medical station" of a comparatively small factory (1500 employees) I was surprised to find a substantial house with several consulting-rooms and facilities for specialised work such as dentistry and gynæcology. First aid and simple treatment are obvious tasks of such a clinic, but equally essential is its duty to ensure that each employee is working under the best conditions that can be obtained for him.[3] The factory medical officer must "know the constitution"—mental and physical—of all in his charge: he must also know the work and workrooms of the factory and he must make arrangements to prevent human breakdowns just as the engineer prevents mechanical breakdowns. All this is especially difficult at a time when an increased tempo of production, with its inducement to overwork, is perpetually demanded; the Soviet Union presents the somewhat contradictory characteristics of a Utopia in the making and of a workshop where each must do his damnedest to increase the national wealth. An interesting instance of compromise between these two tendencies is the institution called a night sanatorium, where people in poor health can live for a time in really good surroundings, with appropriate meals, fresh air, and freedom from worry, while performing their ordinary work during the day.

In Russian cities new houses—chiefly in large blocks of apartments—are springing up everywhere; but their benefits are largely offset by rapid increase of population, and it is scarcely denied that living conditions are very generally deplorable. It is satisfactory at least to find that lessons have been learnt about the dangers of erecting new factories without providing houses, shops, creches, and transport in advance. Nowadays, I was told, the accessories are got ready before the factory is built at all, and the worst evils of hasty urbanisation are thus avoided. I happened to see some dormitories that had been put up for unmarried workers whose homes were far away, and they were adequate for their purpose—probably much better than the homes themselves. An example of workers' housing which most travellers to the U.S.S.R. have a chance of seeing is the crews' accommodation on Soviet ships, which is very good compared with crews' quarters on most English vessels.

THE CITIZEN

Hitherto, of course, the "worker"—that is to say the industrial worker—has been a privileged person in the U.S.S.R., and the medical service of the cities has been founded chiefly on his needs. Those who remain outside this category, be they mathematician, dressmaker, or ne'er-do-well, must take their turn after the others have been served; while members of the "deprived" classes, with an unsound political past, are held to have little claim on the community. These consequences of the Revolution, some of which recall the disabilities of Nonconformists and Roman Catholics in England a hundred years ago, are fortunately abolished under the new draft Con-

[3] In cases of pensionable disability great efforts are made to find work which the pensioner can still perform. He will receive the difference in wages from social insurance funds. With total disability there are arrangements for low rent and other privileges. "Citizens of the U.S.S.R.," says the new Fundamental Law, "have the right to maintenance in old age and also in case of sickness or loss of capacity to work."

stitution, and henceforth a citizen will be a citizen whatever his class or creed.

We have seen that the factory worker is served by his "medical station," and I might have added that his dependents are served by special clinics (ambulatoriums) in the neighbourhood. It remains to be considered what medical arrangements are made for the public at large.

THE HEALTH CENTRE (RUSSIAN VERSION)

Contrary to what is usually supposed, the Soviet régime encourages multiformity: many different routes are tried for reaching similar objectives, and local authorities enjoy great liberty of method. Medical organisations, like others, are difficult to outline; for, as one doctor put it, "if people don't get health through one channel they get it through another." It seems clear however that the central point of urban medical practice is generally a large out-patient hospital (or "polyclinic") which is responsible for most of the necessary services of its locality. It provides, controls, and collaborates with the doctors attached to the clinics, ambulatoriums, creches, kindergartens, and schools; it coöperates with hospitals, maternity homes, sanatoriums, and rest-houses; and it is the centre from which the district medical officers, who most nearly correspond to our family practitioners, set forth on their daily visits. The following description is based on four such institutions I have visited—one in Leningrad, one in Moscow, and two in the Ukrainian Republic (Kharkov and Kiev).

The polyclinic itself may be a very large building or quite a small one. It may be called a polyclinic; or a general dispensary (Moscow); or, to emphasise its preventive functions, a prophylactorium (Leningrad). It may derive its funds purely from the city or partly from the Republic or from "social insurance." It may have no beds at all; it may have beds for treatment during the day (e.g., an anthelmintic ward at Leningrad); or it may provide beds enabling certain types of case to benefit from particular facilities. Thus in the magnificent Third Polyclinic at Kharkov there were no less than 280 beds used (1) for purposes of diagnosis, (2) for patients requiring physiotherapy, (3) for tuberculosis, and (4) for venereal diseases. The number of the staff varies accordingly: in Leningrad, with 4000 attendances daily, it was 400 (125 doctors); in Moscow, with "more than a million" attendances a year it was 600 (200 doctors); while in Kharkov, with 5000 daily attendances, it was no less than 1200 (320 doctors). The Kiev polyclinic, one of many in the city, was relatively small, having a total staff of only 170. The number of attendances must not be taken as a measure of sickness incidence, for their object is very often preventive—e.g., visits to the maternity and child welfare departments.

The area served by one of these institutions, which may have as many as 80,000 inhabitants, is divided geographically into smaller districts containing probably 3000–5000 persons. These are the units of what we may call family medical practice, for each of them is in charge of a "therapeutist" or general practitioner, working from the polyclinic with the assistance of one or more nurses. (Separate arrangements are commonly made for young children, and in Kharkov there is actually a pædiatrician for every district.) These State-paid practitioners work a 5½- or 6-hour day, probably with every fifth day free [4]: for two or three hours they see patients at the polyclinic, and the rest of their time is spent on rounds. Any person arriving at the polyclinic without a particular recommendation will first be given an appointment with his own district doctor, who has notes of all the cases in his charge. If necessary he will then be sent to a special department for investigation or treatment, or to one of the diagnostic services of the clinic.

How far these departments and services are adequate is irrelevant to our judgment of the scheme itself; but in all the three larger institutions I found astonishingly fine equipment, especially for pathological work and physical treatment. (In Kharkov, besides innumerable douches, baths, and electrical devices, there was a gymnasium clinic for the obese and three large rooms for inhalation therapy, including a dozen machines or so for menthol-and-paraffin inhalation in coryza.) The general scope of the work is indicated by the fact that the Leningrad polyclinic employs, among other specialists, 5 oculists, 9 surgeons, 5 ear, nose, and throat surgeons, 26 dentists, 4 gynæcologists, and 5 radiologists. All these are seen (save in emergency) by appointment; and in Kiev, where I was able to test the appointments system at work, I found it fully justified its author's pride. There were no more queues, no more muddle; everyone's convenience was studied. Indeed, as I went round these polyclinics, with their suitably associated departments, their faintly informal atmosphere, their buffets, and their bookstalls, I was impressed again and again by the common sense of the arrangements.

This applies also to the scheme of the district service. We have seen our family doctor at work for two or three hours daily at the polyclinic, interviewing patients from his area. The rest of his brief working day is devoted to those unable to attend for advice. No car is available for his rounds,[5] but the distance covered is by no means great; at the Moscow General Dispensary, for example, it is never more than a kilometre, or 12 minutes' walk. His "medical assistant" or his nurse fulfils the functions of health visitor—persuading, inoculating, discovering sources of danger. When in difficulties he has the whole machinery of the polyclinic behind him, with specialists ready to go out for consultation. When he is off duty there are deputies provided in his place. And when his patient should be treated at home, or dislikes the thought of hospital, he can send for a nurse, linen, food, and whatever he needs (even a good bed) to provide the best conditions for recovery.

"But does this really happen?" you ask. "Is there no pressure on the people to go to hospital?" I cannot say. In Leningrad I was assured that there was no pressure apart from cases of infectious disease, and the dispatch of food and bedding seemed to be part of the normal routine; in Kharkov, on the other hand, I was told that this was very rare. In Leningrad, when I wanted further information, they pointed out that some patients prefer their homes to hospitals and that slight illness is best treated at home; they assured me that even when prosperity arrives, and ample hospital accommodation is available, individual preferences will still be considered. At headquarters in Moscow I gathered that no decision has yet been reached about the further development, or gradual extinction, of home nursing: time is to show what is best.

Any judgment of the wisdom of the above plan of medical practice must be based on a realisation that it is all offered free: the only charge made is for

[4] But this is not so comfortable as it sounds; for, as I shall explain later, doctors in the Soviet Union often hold two or more appointments.

[5] More and more cars are being made in the Soviet Union, but they are not yet purchasable in the open market. Sometimes, however, they are awarded as premiums for good conduct.

bottles of medicine to be taken home. From the English point of view, however, the system has the flaw that it does not seem to allow free choice of doctor. If the patient does not like his doctor, can he change?—"Always the same question from you English" said the interpreter wearily.

I will summarise the answers I was given. In Leningrad, on pressing the point, I was told that a patient who disliked the doctor in charge of his district could arrange to be attended in future by another doctor from another area. (But I doubt if this often happens.) At the Moscow polyclinic a preference of this kind would have no weight unless the patient could *prove* something against the doctor, in which case the latter might be reprimanded or even transferred. In Kharkov the patient must accept the service he is given, but he has the alternative of paying a small fee for medical attendance provided by the Red Cross. Only in Kiev had the patient's wishes been thought as important as we think them in England, and here the director of medical services was able to inform me that everyone is now allowed to ask the help of any doctor on the district staff of the polyclinic. The new plan—established in face of central opposition—has been in force two months, and I fancy it was made feasible only by the comparatively small size of the areas served by each of the polyclinics.

MEDICINE FOR THE PEASANT

In the countryside of Russia, as in the countryside of England, choice of doctor can rarely be attained, and in the vast agricultural dominions of the Soviet Union the medical service, though improving, must often fall far short of intentions. During my own short stay in Russia I came into touch with it only at one point, in the Ukraine, where I paid an unheralded visit to a village hospital serving the peasants of three collective farms. This was an unexpectedly large institution, resembling a cottage hospital, staffed by a resident doctor, a dentist, and three "assistant doctors"—we should probably call them trained nurses. All the women of the village were admitted for delivery of their babies, and the district medical officer (not a resident) used it as a base for his domiciliary service, as I saw by his files of case-histories. Patients needing specialist advice could go to a neighbouring polyclinic or to Kharkov; and, since roads are bumpy, ambulance carriages are provided on the railway that runs beside the hospital. Less surprising is the increasing use of ambulance aeroplanes to supplement rural services: several of these lay in readiness at the Moscow aerodrome, and it is said that no less than 80, designed purely for medical purposes, are kept in Moscow for transport of doctors and material to distant towns and villages. Whether it flies literally or metaphorically, the flying squad is an integral part of medical organisation in a country where local efforts often need reinforcement.

This rural hospital may have been far from typical, and the same may be true of all the institutions I have been able to explore. It is likely enough that the Soviet authorities, though they seem remarkably ready to accept criticism, do not always advertise their failures. Even a little knowledge, however, will dispose of the theory that the achievements of modern Russia are just a façade erected to impress tourists. In medicine, as in engineering, they are part of a vast effort to improve the national life—an effort which bears all the marks of intense sincerity. The situation of doctors in these changing times will be considered in a second article.

SECOND INTERNATIONAL CONGRESS FOR MICROBIOLOGY

(*Concluded from p. 278*)

SOME COMMUNICATIONS TO THE CONGRESS

In a contribution to the section on viruses and virus diseases Prof. K. HERZBERG (Düsseldorf) spoke of the

Staining of Elementary Bodies

He pointed out that hitherto the difficulty experienced in preparing stained specimens of elementary bodies lay in the choice of a suitable dye. It was necessary to obtain one which would select the virus and not colour the cytoplasm of the cell. Prof. Herzberg had found that Victoria blue R4 concentrated in citric acid fulfilled these demands. The elementary bodies are shown up as dark violet or blue-black forms, the plasma and nucleus of the host are only faintly stained. In this way he had been able to demonstrate the elementary bodies in ten virus diseases, and he had been able to follow the entire life-cycle of the viruses in canary disease virus and vaccinia cultured in the embryonic cells of the allantois. Differences were noted in these two strains, for vacuole formation was only observed in the former. Ectromelia virus and zoster virus are at present under investigation.

In the section of serology and immunochemistry Prof. W. W. C. TOPLEY, F.R.S. (London), opened a discussion on

Immunity Reactions in Relation to Antigenic Structure and Variation in Bacteria

Within recent years there had been a significant change in our approach to immunological problems. The earlier workers tended to think in terms of diseases, or of bacteria, or of their toxins—the term "toxins" often being used in a somewhat wide and ill-defined sense. To-day the tendency was to think in terms of separate antigens, and of antigenic structure. Moreover, something was being learnt of the chemical structure of bacterial antigens, or antigenic components, and in some cases at least particular situations in the bacterial cell could be assigned to them. Those who tried to investigate the problem of host-resistance to a particular bacterial infection attempted to analyse the total defence mechanism into a series of effects, some antibacterial, some antitoxic, each of which is conditioned by a specific antigen-antibody reaction. As the ability to simplify and define the problems increased, and particularly as it became possible to replace crude immunological reagents with purified chemical products, there was reasonable hope of attaining a corresponding increase in our control over infective disease. In regard to one particular corner of this field of study—the isolation from pathogenic bacteria of chemically purified substances that are capable of inducing an active immunity—results of some interest and importance had recently been obtained by two independent groups of workers, Boivin, Mesrobeanu, and their colleagues in Bucharest, and Raistrick, Topley, and their colleagues in London. The organisms studied were *Bact. aertrycke*, and certain allied species of the typhoid-paratyphoid group. Summarising the present position, and including in the summary certain observations by the London group of workers that had not yet been published, the experimental evidence, said Prof. Topley, would seem to justify the following conclusions.

From *Bact. aertrycke*, it is possible to isolate an antigen consisting of a complex polysaccharide linked to a non-

protein component containing nitrogen, phosphorus, sulphur, and combined fatty acids. This antigen, in its intact state, is highly toxic for rabbits and for mice. In rabbits, as Delafield has shown, it induces a characteristic hyperglycæmic response; and, as he has found in unpublished studies, this toxic effect is associated with a significant influence on the oxygen uptake of certain tissues in the presence of certain substrates. On injection into mice, in minute doses, this antigen induces an active immunity, of the same order as that induced by intact bacterial cells, to the subsequent injection of living virulent *Bact. aertrycke*. On injection into rabbits it induces the formation of O agglutinins acting on *Bact. aertrycke*, and of precipitins acting on the purified antigen. Thus it would seem that the principal O antigen of this organism is identical with its principal endotoxin, and that one, at least, of the bacterial endotoxins has been obtained in a state approaching chemical purity.

This antigen, when treated with dilute acetic acid at 100° C., splits into a polysaccharide component, which remains in solution, and the non-protein component, containing nitrogen, phosphorus, and fatty acids, which is precipitated. The latter component retains considerable toxicity for rabbits, but is very slightly toxic for mice. When injected into rabbits it stimulates the production of precipitins for itself, or for the intact antigen, but not of O agglutinins for *Bact. aertrycke*. When injected into mice it induces little, if any, active immunity. The obvious suggestion is that this component of the antigen, unlike the polysaccharide, does not form any appreciable part of the normal cell surface.

The polysaccharide component has been found, in unpublished studies, to have properties of particular interest. It consists of a mixture of dextro- and lævorotatory polysaccharides. It is entirely non-toxic for rabbits and for mice, and when injected into rabbits it fails to stimulate the production of either precipitins or agglutinins in detectable amounts; but, when injected into mice, it induces an active immunity of the same order as that induced by the intact antigen. Moreover, the serum of rabbits immunised with this fraction, though devoid of agglutinins or precipitins, confers a significant passive immunity on mice. Analogous results have been obtained with *Bact. enteritidis*.

Prof. Topley said that, in view of these findings, similar experiments had recently been made by the London group of workers with the corresponding fractions isolated from a mouse-virulent strain of the typhoid bacillus. Here, too, the intact O antigen had been found to be toxic and immunising, while the separated polysaccharide component was immunising but not toxic. It might be noted that the intact O antigen from this mouse-virulent strain showed certain peculiarities in chemical behaviour, which were not shared by the O antigen isolated from a mouse-avirulent strain. Whether these differences were in any way associated with the presence or absence of the Vi antigen described by Felix and Pitt, it was as yet too early to say.

Dr. A. BOIVIN described the properties of the antigenic components which the workers at Bucharest had isolated. He noted that complex toxic and antigenic components, possessing the same general type of chemical structure, but each with specific polysaccharide groupings, corresponding to the specific O antigens, had been obtained from dysentery bacilli, *Bact. coli*, *Ps. pyocanea*, and organisms of the Proteus group, as well as from *Bact. aertrycke* and other bacilli of the typhoid-paratyphoid group. A similar antigenic component had been isolated from *Bact. tumefaciens*, and the interesting point had been established that the toxic constituent alone was able to induce the formation of plant tumours similar to those induced by the living bacilli. From certain species of bacteria, such as the pneumococcus, it had not yet proved possible to isolate a "complete" antigen of the type found in organisms of the typhoid-paratyphoid group, the polysaccharide components always appearing in the free state. Dr. Boivin also described studies, carried out in collaboration with Dr. Ramon, in which the method of treatment with trichloracetic acid had been used to separate bacterial exotoxins from bacterial endotoxins.

In the course of a discussion on factors which influence the transmission of infections by arthropod vectors (section of medical zoology and parasitology) Prof. N. H. SWELLENGREBEL (Amsterdam) discussed some of the

Factors Influencing Malaria Transmission *In Nature*

(1) *Gametocyte carriers in vivax-malaria* could not be influenced by quinine, although gametocytes are non-resistant to quinine, because parasite relapses without clinical symptoms provide an important source of anopheline infection. The *vivax* relapse rate ought to drop well below 25 per cent. before the infection rate of anopheles can be influenced. (2) *Larval environment*. Changes man brings about in the breeding-places may destroy the malaria vector without damaging other anopheles. It remains to be proved whether such changes directly influence the ability of a species to transmit malaria. (3) *Stabular deviation* (anopheles lured away from man by stabulated animals). Attraction or non-attraction by animals is a constant character of each species. Man may take advantage of it, but he cannot modify it. (4) *Infective period of anopheles*. Malaria transmission in late summer and autumn is an instance of a factor useful in malaria control. (5) *Localities where infected anopheles accumulate*. Overcrowded houses harbouring parasite-carrying children are foci from which anopheline infection spreads. They can be rendered harmless by fumigation limited to the infective period of anopheles. (6) *Sexual inactivity*. Anopheline infection in late summer is confined to sexually inactive females. (7) *Blood-feeding habits during sexual inactivity*. Sexual inactivity is powerless to promote malaria transmission unless female anopheles continue to take blood. (8) *Climate*. Indoor climate allows indoor anopheles to become infected, but outdoor climate allows infected anopheles to spread.

Prof. F. W. TANNER (Urbana, U.S.A.), speaking to the section of economic biology on the

Microbiology of Canned Foods

said that refrigeration does not destroy micro-organisms but does inhibit their activities. Foods subjected to quick-freezing are perishable and must be kept frozen until about ready for preparation for the table if they are to remain in sound condition and if the development of food poisoning organisms is to be prevented. Canned foods have assumed a position of great importance in many countries. Much research has resulted in products which keep well under storage conditions generally found in commerce and are safe.

Canned foods have generally been defined as sterile foods in a hermetically sealed container. Such a definition can hardly be maintained, and the expression "commercial sterility" has been suggested in its place. That many satisfactory canned foods contain viable micro-organisms is now well established. Some 10 per cent. of various canned meat products and 24 per cent. of canned corn are known to harbour viable micro-organisms; over 50 per cent. of cans of pineapple, according to a recent observer, are not sterile. The presence of bacteria usually considered to be non-heat resistant (coccus-forms)

in such canned foods as meats and meat products is being studied. The conditions in the can which allow such bacteria to survive should be determined. For about ten years, factory-canned food has not caused botulism in America. Home-canned foods, however, continue to take their toll of botulism each year.

THE BANQUET

By the end of last week most members of the congress had visited sections other than those in which they were primarily interested and had made new acquaintances in the process; while the relations between specialists meeting day after day in the same section to discuss common problems had become so intimate that the banquet held at the Trocadero restaurant on July 31st was rather like a colossal family party. This, indeed, was the text of most of the speeches, even those in praise of Leeuwenhoek being concerned largely with his international associations. Prof. H. ZINSSER (Boston), toasting the congress, spoke of the momentous day in 1674 for the little animalculæ when Leeuwenhoek first spied them in fresh water. Until then they had lurked unseen and unsuspected, but thereafter their first line of defence, invisibility, was lost. A draper first pulled them into open daylight and now a modern hatter was pulling their littlest brothers into the glare of the ultra-violet. Those here assembled met in truly international congress in the spirit of Oldenburg, first secretary of the Royal Society, "to commune with all men no matter what their rank or nationality who are working for the promotion of natural knowledge." Such meetings showed, in the words of de Graaf, that the humanities and science cannot be banished from among us by the clash of arms, and brought testimony of the essential instincts for peace and harmony of men and women following in common worthy purposes.

Prof. Zinsser appealed to the patron saint of the congress, Anthony van Leeuwenhoek, to look down upon—

> British, French, German, Russian, American, and from all corners of the wide and turbulent world, utterly unmindful of rivalries or hatreds—intent upon helping one another in common endeavours, rejoicing in each other's successes and sitting in unenvious admiration at the feet of the best among us whatever his age, his station, his race, or his nation. Use your great influence among the Gods, Father Anthony, for uninterrupted international congresses for all types of human affairs! May there be congresses of scholars, of merchants, of clergymen, soldiers, economists, sailors, and farmers—above all of politicians. And may some political Leeuwenhoek discover a microscope by which he can see and define the little animalculæ of enmity and hatred and savagery so that at last, in international congress assembled, wise men may sit in peaceful assembly planning research into the virulences of human stupidity and consider measures of active immunisation, chlorination, and delousing for international politics as we do this for infectious disease.

Tributes were paid to Leeuwenhoek also by Prof. J. C. G. LEDINGHAM, F.R.S., the president, who pointed out that the lag period of two to three months between the receipt of Leeuwenhoek's announcement of his discoveries and their publication by the Royal Society compared not unfavourably with the delay in the appearance of papers communicated to certain scientific journals to-day; by Prof. A. J. KLUYVER (Delft) who said that the Royal Academy of Sciences of Amsterdam projected the issue of a new edition of his works in the original text and in an English translation; by Prof. F. MESNIL (Paris), speaking in French, who also referred to the pious labours of Prof. Clifford Dobell, F.R.S., in making widely known Leeuwenhoek's works. Prof. F. NEUFELD (Berlin) responded, he said, on behalf of the "little animals" about which so much had been taught and learnt during the last few days; those moderns who held the study of bacteriology to be a bit out of date would have altered their views had they attended this congress. Since there might be some present—perhaps three or four—who would understand him better in English, however faulty, than in German (laughter) he concluded in the former language by wishing that all present might live to the great age of 91 reached by Leeuwenhoek, and in the interval be as kindly received at many future congresses as well organised and conducted as this one. Dr. E. MELLANBY, F.R.S., said that he represented Section 9 of the congress—the section not described in the programme—which was composed of those whose knowledge of modern microbiology about corresponded to that of Leeuwenhoek. In his day bacteriology was a more or less simple affair, the pursuit of which required no background of chemistry or physics, but merely a test-tube or two, some agar, a few sugars, and a platinum loop; it had now developed into a science so potent in the prevention and cure of disease that clinicians might well take alarm. Those onlookers who had watched this curious development of microbiology from a Cinderella into a white-headed boy could only marvel and pledge themselves to do what they could to help the further progress of this wonderful science. Miss MURIEL ROBERTSON, D.Sc., proposed the guests, gathering together the threads of the previous speeches and weaving them into pleasant valediction, and replies by Sir GOWLAND HOPKINS, F.R.S. (Cambridge), Prof. I. FORSSMAN (Lund), Prof. BUCHANAN (Iowa), Prof. J. BORDET (Brussels), and Lord HORDER left no doubt as to the social as well as the scientific success of the congress, which will meet again in America three years hence.

THE ANNUAL IRISH MEDICAL LUNCHEON

THE luncheon was held on Wednesday, July 22nd, at the Clarendon Hotel, Oxford, when a large number of Irish doctors and surgeons, present at the meeting of the British Medical Association, foregathered and entertained a group of representative guests. About 100 sat down to luncheon. The tables were appropriately decorated in green; and the menu card bore the traditional emblem the Celtic cross, Round tower, hound, and harp, resting on shamrock. The Latin grace was said by the Rev. Middleton Evans. The loyal toasts having been honoured, Col. G. A. Moore, A.M.S., proposed "The Guests," in his best oratorical manner associated with the peripatetic style for which he is famous—those who have attended these functions will take the allusion—when Sir Farquhar Buzzard, president of the B.M.A., responded. In his impressive speech the references to Irish doctors and scientists contained one to a surgeon named Costello, who performed a lithotrity on a patient in the town hall, Oxford, the mayor having given the necessary permission. In the absence of Dr. G. C. Anderson, called away to a committee, the toast of the Irish Medical Schools and Graduates Association was given by Dr. Bodkin Adams, when Dr. J. A. E. Lynham, president of the association, replied and welcomed the English doctors present, his witty speech containing a natural reference to his father, the late professor of medicine, Queen's College, Galway. Thanks were returned in a cordial vote to Dr. J. Lougheed Baskin who organised the luncheon.

THE MEDICAL DIRECTORY

UNCOMMUNICATED ADDRESSES

THE Editor of the "Medical Directory," 104, Gloucester-place, Portman-square, London, W.1, desires to notify members of the medical profession that certain of their number, whose names appear below, have not communicated to him their present address. He asks that the persons in question, or their friends, will kindly give the information without delay. Otherwise the words (*address uncommunicated*) will appear in lieu of an address in the forthcoming 1937 issue. The date of registration is shown in parentheses.

Absher, Chas. Omer (1930).
Achpise, Alexandre (1923).
Adair, Thos. McCormac (1895).
Adam, Basil John (1886).
Adams, Samuel Kirkpatrick (1903).
Agar, Morley Fredk. (1892).
Alam, Shaikh Sultan (1932).
Albertijn, Lindley (1918).
Alexander, John Neville (1924).
Allan, Mrs. Isobel Campbell (1925).
Allardyce, Ransome Macnamara (1926).
Allen, Frederick Thos. (1919).
Allen, Wm. Guy Embleton (1915).
Allison, Arthur Cecil (1929).
Altman, Asher Lyons (1881).
Amy, Geo. John (1893).
Anderson, Redvers (1924).
Andrews, Harold Newton (1921).
Ansari, Obaidullah M. T. (1933).
Ashley, Tom John (1931).
Ashton, Fredk. Ieuan (1930).
Ashton, John Morgan (1926).
Atcherley, John (1892).
Atkey, Oliver Francis Haynes (1903).
Austin, Winston Eric (1935).
Austin, Reginald (1929).

Ball, Godfrey Dacre Jennings (1927).
Ballantyne, John (1896).
Banerji, Upendra Nath (1920).
Bannister, Marmaduke (1887).
Barnabas, Thos. Alfred (1929).
Barr, Margaret A. (Mrs. Thomson) (1933).
Barras, Mrs. Kathleen (1919).
Basu, Amiya Kumar (1931).
Basu, Uma Prasanna (1919).
Bates, Hy. Leslie (1880).
Battista, Rebizzi (1930).
Beasley, Hy. Cecil (1893).
Beaugie, Donald McNicoll (1932).
Beer, Sharman (1932).
Begg, Herbt. Napier Crawford (1933).
Behari, Raghunand (1930).
Bennett, Fredk. Joseph (1879).
Berg, Hendrik Jacobus van den (1927).
Bernard, Robt. Spence (1892).
Bhatt, Prabhulal Devshanker (1932).
Bingham, Chas. Albert (1924).
Binnie, John Fairbairn (1886).
Bisset, Ian Gordon (1914).
Biswas, Lalit mohon (1913).
Blewett, Chas. Henry (1932).
Bocarro, Jas. Lionel (1913).
Bolger, Patrick Thos. (1887).
Bond, Hopetoun Edwd. (1910).
Bonham-Carter, Richd. Erskine (1936).
Bonin, Adrien (1911).
Bonis, Robert Jas. (1908).
Bonney, Hy. Claude (1925).
Booth, Sydney (1894).
Bortz, Abraham (1926).
Bottrell, Stanley Hy. Reginald (1892).
Bourke, John (1927).
Boyd, John Ellison (1924).
Boyd, Philip Irving (1935).
Boyle, Geo. Vincent (1926).
Bradshaw, Desmond Burton (1932).
Brady, Patrick (1900).
Breen, Michael (1923).
Brookes, Wm. Gordon (1927).
Brown, Alfred (1887).
Brown, Kenneth Stocks (1920).
Brown, Richard (1891).
Brown, William (M.B. N.Z., 1931).
Bruce, Edna Winifred (1925).
Bruce, Hugh Gilbert (1912).
Bryan, Thos. Blomefield Lewis (1934).
Buchanan, Marion Elizabeth (1930).
Burt, Albert Hamilton (1897).
Bussiere, Hy. Chas. (1925).
Butterfield, Geo. Richd. (1933).

Cahill, Robt. John (1903).
Caldwell, John Colin (1920).
Cameron, Hugh Fraser (1890).
Cameron, Margaret Elizabeth (1930).
Cameron, Patrick Stephen Gerard (1918).
Campbell, Ernest Kenneth (1885).
Campbell, John (1922).
Campbell, John (1928).
Caple, Harold Henry (1936).
Carew-Smyth, Raymond Ponsonby (1930).
Carrington, Geo. Hedwig (1884).
Cassar, Albert (1907).
Cassidy, Michael Ardagh (1923).
Chadsey, Louis Colvin (1929).
Chambers, Wm. Huntley (1934).
Chandrasekharan, Trichinopoly (1932).
Chapman, Robt. Sturgeon (1921).
Cherry, John Douglas (1913).
Cheune, Nai (1913).
Chisholm, Alex. Fraser (1925).
Chopin, Leopold (1922).
Chowdhury, Brajanath Das (1933).
Clark, Arnold (1926).
Clark, Wm. Adam, (1929).
Clarke, Allan Wise (1887).
Clarke, David Dickie (1926).
Clarke, John Joseph (1904).
Clarke, Joseph Patrick (1889).
Clarke, Roy (1934).
Clein, Peter David (1921).
Clements, John Hall (1902).
Cock, Gerald (1914).
Cohen, Hyman (1933).
Collier, Samuel Ruddell (1887).
Collinson, Walter Julius (1899).
Colombowala, Munchersha Rustomjee, (1903).
Conlin, Arthur Joseph (1926).
Connolly, Peter John (1922).
Connor, Jas. Michael (1929).
Conroy, Jack Isaac (1932).
Constant, Chas. Frederick (1912).
Consul, Shiamnath (1931).
Coomber, Arthur Beauchamp (1907).
Courtney, Patrick Joseph (1929).
Cowan, Alex. Rea (1927).
Crawford, Chas. Sinclair (1932).
Creighton, John Alex. (1891).
Creedon, Francis (1925).
Crichton, John Pringle (1920).
Crosse, Herbert Wm. (1891).
Crossley, Harold Tattersall (1926).
Crowley, Daniel Finbarr, (1922).
Culligan, Edwd. Augustus (1895).
Cuthbert, Jackson Cooper (1926).

Danasamy, Swaminadan (1917).
Daneel, Josias (1922).
D'Anna, Antonino (1929).
Das, Upendra Nath (1921).
Davidson, Arthur Robertson (1900).
Davies, Helen Isabel (1923).
Davies, Kenneth Jas. Herbt. (1921).
Davis, William Hy. (1880).
Davison, Rashell Thos. (1874).
Dawson, Thomas (1893).
Deadman, Wm. Jas. (1927).
Deane, Arthur Maslen (1904).
Deboo, Sorabji Navroji (1920).
Deem, Mrs. Muriel Helen (1934).
De la Pasture, Yolande M. (1925).
Dick, Andrew (1917).
Diggett, Ernest Wm. (1917).
Dimond, John Lyn (1900).
Dirckze, Herbt. Augustus (1926).
Dixon, Chas. Wm. (1914).
Dodds, Jessie Elizabeth (1929).
Dodhi, Miss Avabai Jehangirji (1920).
Dorion, Walter Alphonso (1904).
Driberg, Jas. Douglas (1913).
Duff, Alex. Dewar (1928).
Duff, Thos. Francis Aiden (1933).
Duguid, William (1914).
Duke, Francis Vincent (1925).
Dunlop, David Cowan (1926).
Dunlop, John (1894).
Dunn, Spencer Smithson (1888).
Dunne, Brian John David (1932).
Dunning, John Beatson (1908).

Eagles, Victor Thos. Wm. (1912).
Eakin, Matthew John (1935).
Eason, Grace Winifred Wilson (1923).
Edwards, Chas. Reginald (1908).
Elder, Douglas (1905).
Eloff, Johan Sarel (1917).
Elphick, Sidney Ernest (1915).
Elworthy, Hy. Herbt. (1904).
Emery, Fredk. Harold (1928).
England, Herbert, (1895).
English, Michael Alphonsus (1921).
Erskine, David (1894).
Evans, Ivor Quarren (1929).

Fair, Aileen (1925).
Fairley, Eric Wm. Rambant (1935).
Fannin, Lewis Edwin (1898).
Fenning, John Reginald Keith (1917).
Ferguson, Malcolm (1892).
Flach, Arthur (1902).
Fleischer, Martin (1905).
Flenley, Denis (1923).
Flett, Sir John Smith (1894).
Fogarty, Bridget Mary (1919).
Fogarty, Wm. Philip (1919).
Foley, John Edmund (1894).
Ford, Donald McNeil (1901).
Fortin, Joseph Napoleon (1920).
Foston, Edmund Christopher (1889).
Fowler, Gordon (1893).
Franklin, Arthur (1929).
Fraser, Geo. Angus Paterson (1927).
Freeborn, Wallace (1927).
Freeman, Joseph (1899).
Freeston, Mabel Octavia C. (1928).
Frost, Robt. Oakley (1921).
Fullerton, John Alex. (1925).

Gall, Geo. Lockhart (1919).
Galwankar, Gangadhar Dinkar (1933).
Gamble, Edwd. Moore (1927).
Gamlen, Harold Ernest (1925).
Gardiner, David Gould (1915).
Gardiner, John Percival (1933).
Geary, Herbt. Voisey (1922).
George, Alfred Walter (1889).
Ghaleb, Saved (1925).
Ghosh, Dwijendra Nath (1930).
Gibbens, Fanny (1900).
Giblin, Arthur Leslie (1916).
Giblin, Hubert Thos. (1932).
Gibson, Michael Joseph (1901).
Gilmore, Eric St. Geo. (1926).
Glaister, Joseph (1905).
Gleeson, Ella (1919).
Glover, Frederick Richd. (1931).
Goggin, Mary (1925).
Goggin, Mary Frances (1925).
Goldberg, Isaac (1924).
Goode, Alan Francis (1932).
Gool, Goolan Hoosen (1931).
Gore, Lionel (1932).
Gori, Rosario (1932).
Gourlay, Jas. Dickson (1901).
Gouws, Johan Nicolaas Sauer (1926).
Gover, John Maxwell (1898).
Graham, Kenneth James Menteith (1928).
Grahame, Leo Chas. (1934).
Grant, Robt. Alfred (1925).
Grave, Chas. Fredk. (1899).
Gray, John Montgomery (1927).
Green, John Harold (1933).
Greene, Samuel S. (1921).
Griffiths, Gwenvron Mary (1919).
Grigor, Martha Kirkland (1935).
Grimoldby, James (1908).
Grodd, Sandow (1934).
Groom, John Long (1926).
Guest, Fredk. (1920).
Gugino, Vincenzo (1933).
Gunn, John Cooper (1927).

Hall, Phyllis (1923).
Halloran, Kathleen May (1926).
Hallpike, Chas. Skinner (1924).
Hamilton, Dennis Godfrey (1928).
Hamilton, Janet Mary Lyle (1927).
Hardaker, Fredk. Geo. Brunton (1927).
Harper, Rodolphus Whittaker (1905).
Harris, Clayton Campbell (1886).
Harris, Cyril Robt. (1928).
Harris, David Benjamin Luke (1929).
Harrison, Wm. Chas. Burke (1929).
Hart, Constance (1915).
Hart-Mercer, John (1934).
Hartley, Evelyn Francis (1926).
Hartley, John Whittam (1904).
Haslett, Selwyn Langstaff (1915).
Hattiangadi, Umanath Rao (1918).
Hay, Thomas Hy. (1894).
Hay, Walter (1887).
Hayes, John Joseph (1918).
Hayes, Roland Marcus (1935).
Hayward, Frank Robt. (1932).
Hayward, Sydney Thos. (1932).
Hemming, Albert (1933).
Henderson, Gertrude (1924).
Hennell, Leo (1928).
Henry, Geo. Arnold (1933).
Heron, Wm. (1927).
Hershfield, Harry (1923).

Hetherington, Harry Brown (1926).
Hewitt, John Wishart Welsh (1914).
Hewitt, Samuel Ross De Lap (1917).
Heywood, Thomas (1892).
Higgins, Hubert, (1888).
Higgins, Thos. Francis (1914).
Hill, Esme Mary (1928).
Hill, Isobel Russell (1922).
Hind, Florence Winifred (1914).
Hinde, Alfred Buckley (1886).
Hingst, Hy. Conrad (1933).
Hittleman, David (1933).
Hocken, Donald Falconer (1932).
Hoffman, Julie Elise (1913).
Hogan, Mary Gabrielle (1922).
Holmes, Bernard Willoughby (1896).
Home, Fredk. Christian Hy. (1901).
Homer, Chas. (1908).
Hopkin-James, Edwd. Evelyn Rhys (1932).
Horan, Mary (1921).
Horgan, David (1909).
Hosny, Mostafa Hassan (1934).
Howard, Henry (1880).
Howell, Trevor Hy. (1934).
Hunt, David Mackenzie (1916).
Hunter, Andrew (1884).
Hutchison, John (1933).
Hutton, Effie Lilian (1928).

Ilos, Mary M. G. (1900).
Ireda le, Jabez Percival (1891).
Iyengar, Mandayam A. P. (1919).

Jack, Alex. Fraser (1900).
Jacobs, Martin Herholdt (1924).
Jacques, Harold (1903).
Jain, Barnarsi Das (1927).
James, April Doreen (1929).
James, Herman Haughton (1924).
James, Thos. Glyn (1917).
Jeeves, John (1889).
John, Thayil Cheriyan (1932).
Johnston, Hugh Clyde Armstrong (1933).
Jones, Clifford David Phillips (1931).
Jones, Daniel Marinus (1882).
Jones, David Wm. (1914).
Jones, Harry Victor Mainwaring (1923).
Jones, John (1925).
Jones, Wm. Mercer (1932).
Jones, Wm. Watkiss (1904).
Jubb, Archie Vivian (1905).
Juhasz, Alexander (1930).

Kahn, Abraham Lionel (1933).
Kamdin, Rustom Dossabhoy (1915).
Kaul, Sarveshwar Nath (1926).
Kaye, David Wm. Stewart (1929).
Keating, Nicholas (1912).
Keenlyside, Ronald (1924).
Keith, Hugh (1893).
Kelleher, Julia Lucy (1915).
Kelly, Edwd. Patrick (1927).
Kendall, Ernest Robt. (1895).
Kendall, John Wilson (1926).
Kennedy, Cornelius (1912).
Kennedy, Fredk. Wm. (1891).
Key, Jas. Albert (1917).
Khan, Abdul Aziz (1934).
Khan, Abdur Rahman (1934).
Khan, Haji Hyderali (1916).
Kilroe, Sidney Herbt. Jas. (1908).
Kimbell, Claude Wilfred Alfred (1932).
King, Gerald Geo. (1928).
Kirkpatrick, Gordon Mackay (1931).
Kitchin, Percy (1895).
Knight, Robt. Gavin (1932).
Kushner, Alexander (1934).

Lanceley, Hilda Irene (1934).
Latham, Henry (1893).
Laurence, Ernest Gordon (1928).
Lawn, John Arthur Ernest (1933).
Lawrence, Marjory Irene (Mrs. Black) (1934).
Lawrence, Wm. Jamieson (1926).
Lawrie, Chas. Malcolm (1931).
Leadbetter, Jas. Louden (1896).
Lee, Sem Foh (1925).
Lee, Wm. Emerson (1904).
Leicester, Wm. Samuel (1907).
Leigh-Barlow, Vivian Hector (1927).
Leslie, William (1915).
Levy, Hirsch (1925).
Lewellyn, John Woodruff (1902).
Lewis, Edmund Oliver (1921).
Lewis, Glyndwr Morison (1920).
Liddy, Jas. Christopher Anthony (1929).
Liston, Jas. Campbell (1922).
Little, Paul MacDonald (1915).
Lloyd, John Tryweryn (1904).
L'Oddo, Giovanni (1926).
Logan, Herbt. Lemuel (1925).
Logan, Roderick Robt. Walter (1890).
Lomax, Raymond Fredk. (1930).
Long, Jas. Ernest (1898).
Long, Joseph John (1891).
Lozina, Constantine (1922).
Lucas, Freda Miriam Levy (1933).
Lupton, Jas. Parkinson (1910).
Lynch, Ita Mary (1926).
Lynch, Jas. Gerard (1928).
Lyons, Alexander (1901).
Lyons, Fredk. Maxwell (1930).

McArthur, Peter Alex. (1924).
McBride, Chas. Arthur (1887).
McBride, John Best (1886).
McCartan, Patrick (1910).
McClymont, Albert Geo. (1933).
McCormick, Jas. Patton (1922).
McCubbin, Brian Arthur (1926).
McCutcheon, Oliver Edwd. (1896).
McDevitt, Thos. Stanislaus (1928).
McDonagh, Joseph Edwd. (1921).
McDonald, Donald Alex. (1931).
Macdonald, Jane Watson (1921).
Macdonald Stella Constance Christian (1926).
McDowall, Margaret Martin (1920).
Maceuan-Robinson, Matthew Edwd. (1915).
McGilvray, John Robt. (1906).
Macgown, John Cecil (1922).
MacHugh, Mary Antonia Columba (1926).
MacIntyre, Edwd. Tambyah (1913).
Mackay, David Dunn (1914).
Mackay, Elizabeth Kathleen (1922).
Mackenzie, Andrew Hardie (1915).
MacKenzie, Donald (1928).
McKenzie, Florence Emily (1920).
Mackenzie, Kenneth Wm. (1905).
Mackie, Elsie (Mrs. Home) (1921).
McKnight, Maude W. (1922).
McLaughlin, Thos. (1875).
MacLennan, Ian Mackintosh (1931).
McLintock, Jas. Maitland (1926).
McLoughlin, Douglas Drummond Ogle (1924).
McMillan, Thos. (1889).
Macphail, Katherine Stewart (1911).
McPherson, Robt. Jas. (1924).
McPherson, Veronica Catherine J. (1919).
McWhirter, Jas. Russell (1934).
Madappuli, Coruvakankanange D. M. (1925).
Magauran, Wm. (1935).
Maguire, Chas. (1920).
Majmudar, Vyomeshchandra S. (1933).
Malone, Francis De Sales (1924).
Manion, Robt. Jas. (1906).
Manning, Herbt. Campbell (1897).
Marr, Jas. Scott (1933).
Marshall, Chas. Frederic (1890).
Marshall, Eric Stewart (1907).
Marshall, Wm. Gray (1884).
Marston, Hallé (1932).
Martin, Geo. (1894).
Martin, Louis Chas. (1900).
Masson, Geo. Aird (1923).
Masson, Hamish Falconer (1926).
Mathewson, Andrew (1915).
Matthews, Hugh Rutherford (1923).
Matthews, John Hugoe (1924).
Matthews, John Sextus (1922).
Maurer, Hy. Wm. (1930).
Mayne, Fredk. John (1927).
Meiring, Sylvester Hy. (1918).
Menary, Vera Gladys May (1922).
Menzies, Edwd. Gordon Dewar (1899).
Merry, Jean McMurray (1917).
Meyer, Else Fransiska (1934).
Meyler, John Francis Cooper (1899).
Michelson, Everett Gladstone (1921).
Mikhail, Hakim Murcos (1928).
Mill, Wm. (1882).
Millar, Jas. Grant (1901).
Mills, Ernest Anthony Killeen (1922).
Milne, Geo. Gordon (1924).
Mirchandani, Anandram Harumal (1925).
Mistri, Shavax Nasarbanji (1929).
Mitchell, John (1909).
Mohd, Asiam (1931).
Moloney, Wm. Joseph (1913).
Mooney, Gerald Wm. (1912).
Moore, Geoffrey Stuart (1899).
Moriand, Grace (1915).
Morrison, David (1894).
Morrison, Rosa (1931).
Morrison, Wm. Harold (1900).
Morshead, Reginald Sperling (1911).
Moser, Richd. (1916).
Moynihan, Wm. (1922).
Mukhopadhyay, Binay Bhushan (1934).
Mullins, Wm. Leo (1923).
Murison, Kathleen Duffus (1925).
Murray, Arthur Hill (1881).
Murray, Francis Xavier (1920).

Naidu, Bangalore P. B. (1914).
Naidu, Carcherla R. (1935).
Nanjiani, Barkatali S. (1932).
Nasmyth, Roy Douglas (1920).
Natali, Claudio (1933).
Nelson, Geo. Alfred (1928).
Nesbitt, Jas. Anderson (1932).
Neve, Mrs. Helen Ronaldson (1929).
Newton-Davis, Mary Howard (1911).
Neylon, Joseph Anthony (1922).
Niaz-ud-Din (1933).
Nichol, Robt. (1892).
Nicolson, Jas. Stuart (1902).
Nolan, Jas. Noel Greene (1912).
Norrie, Mrs. Cecil Robertson (1909).
Norrie, Forster Heddie Brown (1915).
Norris, Marjorie (1921).
North, Harold Deacon Barker (1935).
Northcott, John Ford (1899).
Nye, Cyril Walter (1929).

O'Brien, Helen (1921).
O'Brien, Wm. Joseph (1922).
O'Bryne, Niall Conor (1932).
O'Connell, Wm. Finbarr (1932).
O'Connor, Arthur J. de L. (1922).
O'Connor, Mrs. Nora (1926).
Odium, Lawrence Edwd. (1934).
O'Donnell, Timothy Joseph (1924).
O'Donoghue, Thos. Francis (1915).
O'Donovan, Louis Jerome (1912).
O'Driscoll, Florence Joseph (1928).
O'Driscoll, McCarthy (1921).
O'Flynn, Jerome (1913).
O'Keeffe, Daniel Joseph (1889).
O'Kelly, Patrick (1925).
Old, Geo. Greensill (1915).
Ollerhead, Hy. Sandford (1907).
O'Loughlin, Herbt. John (1931).
O'Mahony, Joseph Patrick (1926).
O'Neill, Cyril Aloysius (1924).
Ord, Harry Douglas (1929).
Orok, Robt. Dick (1908).
Orr, Jas. Wilson (1933).
Osborn, Adam Downey (1932).
O'Sullivan, Peter Finbarr (1922).
Overstead, John Edwd. (1922).
Owen, Thomas (1915).
Owen, Wm. Vaughan (1936).
Owen-Morris, Will Geo. Fredk. (1917).
Owens, Robt. David (1925).

Palmer-Field, Richd. Ernest (1928).
Park, Anna Rebecca (1926).
Park, Max (1930).
Parry, Wm. Wynn (1932).
Paterson, Douglas McKnight (1930).
Pattabhiramayya, Papatla (1929).
Patterson, Alex. John (1912).
Patterson, Edwd. Louden (1934).
Patterson, Fredk. Leslie (1925).
Pearce, Wm. Thos. Ashton (1927).
Pearson, Kate Y. (Mrs. Steele) (1923).
Phillips, John Albert (1890).
Platt, Frank Bertram (1929).
Pollock, George (1932).
Poole, Wm. Joseph (1930).
Pooley, William (1879).
Port, Arthur Wm. (1893).
Portway, Robt. Louis (1916).
Powell, Ievan Herbt. (1913).
Procter, John Adamson (1893).

Raeburn, James Alex. (1898).
Rajaratnam, Kathirithamby (1930).
Ramsay, Mary Frances (1923).
Rankin, Fredk. Powlett (1914).
Rasanayagam, Suppiah (1929).
Razdan, Jagmohan Lal (1931).
Reckless, Philip Alfred (1907).
Rees, Hugh Llewellyn (1927).
Reid, Alex. Wm. (1894).
Reid, Peter (1911).
Reid, Wm. Ewen (1905).
Rekhi, Miss Raseela (1931).
Renton, John Walker (1902).
Rhatigan, Andrew Thos. (1919).
Richardson, William (1877).
Richmond, Daniel (1894).
Rifkill, Frank Louis (1923).
Roberts, Adeline Mary (1898).
Roberts, Fredk. Ewart (1925).
Roberts, Sarah (1925).
Robertson, Alex. (1908).
Robertson, Edward Alex. (1928).
Robinson, Niel Surgey (1926).
Robson, Jas. Smylie (1932).
Roche, Wm. John (1927).
Rodolph, George Hy. (1907).
Rose, Leopold Wm. (1927).
Rosenbaum, Alfred (1936).
Rosenberg, Wilfred (1927).
Ross, Gordon Winiford (1917).
Ross, Wm. Percival (1923).
Round, Margaret (1925).
Rubin, Hyman Leon (1923).
Runciman, Mrs. Helen (1904).
Russell, Audrey Eva (1926).
Russell, Chas. Scott (1927).
Rustogi, Hari Krishna B. (1934).

Saha, Kalidas (1930).
St. Pierre, Damien (1925).
Salmond, Paul Hammersley (1920).
Samuel, Jas. Albert (1892).
Saraidarian, Onnik (1928).
Sargent, Wm. Victor (1919).

Sash, Max (1918).
Schwartz, Felix (1934).
Scoresby-Jackson, Thos. (1905).
Scott, Geo. Orville (1919).
Searle, Geo. Percy (1898).
Sen, Ajit Kumar (1930).
Sen, Susanta Kumar (1933).
Sen Gupta, Joti Ranjan (1930).
Sharpe, Samuel Garland (1887).
Sharpley, John Ernest (1890).
Shaw, Harry Chas. Costello (1884).
Sheldon, Thos. Wm. (1915).
Sheorey, Narayan Lakshman (1915).
Shipsey, William Edwd. (1919).
Sim, Jas. A. Bruce (1905).
Simms, Harold (1903).
Simpson, Colin Finlayson (1910).
Simpson, John Laird (1898).
Singer, Kildare Lawrence (1917).
Singh, Balwant (1928).
Singh, Manmohan (1928).
Singha, Miss Abhayabala (1909).
Slack, John Rodley (1914).
Smalpage, Edwd. Stanley (1920).
Smerdon, Edgar Wilmot (1908).
Smith, Donald Bruce (1925).
Smith, Dorothy Barnard (1932).
Smith, Geo. Walker Manning (1920).
Smith, Irwin (1932).
Smith, Joseph Neelands (1933).
Smuts, Cornelius Reitz (1923).
Smythe, John Francis (1900).
Snowdon, Alan Richmond (1911).
Stephens, John Edwin Sandys (1929).
Stewart, Jas. Lennox (1912).
Stewart, Wm. Aiken McEwan (1922).
Stober, Wm. Edwd. (1925).
Stone, David (1887).
Store, Frederic Robt. (1933).
Storey, Francis Hubert (1905).
Struthers, Robt. Rolf (1920).
Stuart, Sophia Keith Grant (1918).
Summerhayes, Julius Wilfrid (1931).
Suri, Harish Chandar (1922).
Sutherland, Arthur Leslie (1900).
Sweeney, Joseph Francis (1924).
Sykes, Leo (1931).
Sze Pong Chan (1907).
Taylor, Chas. Johnston S. O. (1929).
Taylor, Constance Lang (1932).
Thompson, Edith Joan (1932).
Thompson, William Geo. (1899).
Thomson, Andrew Rutherford (1917).
Todd, Hy. Bansall (1887).
Tomlinson, John Hy. (1897).
Tooth, Geoffrey Cuthbert (1934).
Townsend, Cecilia Columba (1923).
Traill, Jeannie Hamilton (1899).
Treston, John Francis (1899).
Turner, Denis Pritchard (1930).
Tweedie, David Reid (1927).
Varadarajan, Pudukotah S. (1930).
Vaus, Mrs. Nellie (1920).
Vesey, James (1926).
Viljoen, Jacobus (1925).
Vincent, Samuel Anderson (1933).
Waldron, Michael (1908).
Walker, Jas. Livingstone (1919).
Walker, Joseph (1926).
Wallace, Herbt. Kelvin (1922).
Wallace, Patrick Joseph (1926).
Waller, Joycelyn Langton (1914).
Walsh, Theodore Edwin (1925).
Wark, Kathleen Jane (1932).
Waters, John Francis Wm. (1897).
Watkins, Lewis John (1924).
Watkins-Pitchford, Hy. Otley (1924).
Watson, Samuel Ernest (1911).
Watterson, Thos. Albert (1918).
Webb, Fred Earlby (1920).
Webster, Nora Agnes M. (1923).
Webster, Reginald Christopher (1928).
Weir, Ethel Mary (1927).
Wells, Wilfrid Wood (1907).
Were, Mary Josephine (1913).
Whiteacre, Laura (1927).
Whiteacre, Robt. Dermod (1927).
Whitfield, Arthur Thos. Dingley (1928).
Whitman, Vivian Emlyn (1924).
Whyte, Elizabeth Constance (1925).
Williams, Francis (1928).
Wilson, Apolina Anderson (1920).
Wilson, Gwendolen (1918).
Wilson, Roland Francis (1933).
Wisewould, Percy (1887).
Wood, Audrey Rose (1934).
Woodfield, Thos. Harold (1893).
Wright, John Eric Gaskin (1935).
Wright, Reginald Leslie (1919).
Wulffaert, Franz (1915).
Wykerd, Hermanus Claassens (1925).
Yell, Wm. Lyall (1917).
Young, James (1909).
Yule, Mrs. Frances Marjorie (1921).
Yusif, Nashid Tadros (1925).
Zagni, Luigi (1934).
Zobel, Samuel (1904).

MEDICINE AND THE LAW

What is a "Newly Born" Child?

IN R. *v.* Hale Mr. Justice Humphreys has given Parliament a hint of a legislative gap which needs to be filled. The Infanticide Act of 1922 enables a mother to be found guilty of infanticide (and thereupon to be dealt with as for manslaughter and not for murder) if she has wilfully caused the death of her newly born child at a time when she had not fully recovered from the effect of giving birth to the child "and by reason thereof the balance of her mind was then disturbed." The Act omitted to define the words "newly born." Lord Dawson of Penn, called as a witness for the defence in R. *v.* Hale, expressed the view that the words would ordinarily cover the period up to four weeks from birth. "When," he said, "we study the mortality of the early period after birth, we are accustomed to fix a month." He added that the official statistics of the Ministry of Health adopt the same period for the purpose. The matter would seem to be one where medical science can give the law a lead.

Mrs. Hale, aged 24, developed symptoms bordering on puerperal insanity three weeks after the birth of her first child. After the birth of her second child last May similar symptoms appeared. The baby was found dead in a bath and Mrs. Hale was found to have injuries to her throat. Indicted for murder, she pleaded "Not guilty." Lord Dawson said he thought that, at the time when Mrs. Hale committed the act, she was suffering from puerperal insanity and did not know what she was doing. Asked how long he would say it took a woman to recover from the conditions of birth, he answered "not less than three weeks and in many cases longer." Mr. Justice Humphreys, in summing up to the jury, explained that he was bound by a decision of the Court of Criminal Appeal which affirmed the ruling of a judge in 1927 that, after a month from birth, a child could not be a "newly born" child within the 1922 Act. The case to which he referred was R. *v.* O'Donoghue where the dead child was more than a calendar month old. Mr. Justice Talbot on that occasion held that there was no evidence on which the jury could treat the case as one of infanticide since the child could not be deemed newly born. Counsel for the accused afterwards endeavoured to persuade the Court of Criminal Appeal that the adjective "newly born" must be interpreted in the light of the non-recovery of the mother from the effects of the birth. Lord Hewart dismissed the argument by saying that, if correct, it would eliminate the words "newly born" from the statute; he refused to commit the Court to the task of defining the words. In the recent case Mr. Justice Humphreys suggested that Parliament should pass a short section specifying that in the 1922 Act "newly born" means born within four weeks—the period indicated by Lord Dawson.

The Verdict of "Guilty but Insane"

The trial of Mrs. Hale was notable for another point where fresh legislation is recommended. The judge suggested that the jury, if it came to the conclusion that Mrs. Hale was not responsible for her action, should find her "not guilty of murder but guilty of the act charged for which she was not responsible in law." The jury did so, and the judge directed that she be detained until His Majesty's pleasure be known. This form of verdict forsook the standard formula "guilty but insane" with which the law has stultified itself since 1883. As everyone knows, if an accused person is insane in the legal sense, he or she cannot be guilty of a criminal offence. Lord Atkin's Committee on Crime and Insanity brought out this anomaly and recommended that Parliament should remedy it; the Home Office, however, has refrained from even this modest interference with the present law of criminal responsibility. The story of the change in the form of the verdict of 1883, is well told in the lively pages of Lytton Strachey's "Queen Victoria." Roderick Maclean fired a loaded pistol at the Queen at Windsor at a distance of a few yards. An Eton boy struck up Maclean's arm with an umbrella; the Queen was unharmed and the culprit was arrested. Tried for high treason, Maclean was, in the then usual formula, found "not guilty but insane." The Queen was dissatisfied. What did the jury mean by finding

Maclean "not guilty"? Of course he was guilty; she had seen him fire the pistol herself. If that was the law, the law must be altered; and altered it was. Mr. Justice Humphreys seems to have taken a sensible course in altering it back again, though without the authority of the legislature.

Failure of Communications at Hospitals

In a case recently investigated by the Preston coroner a doctor had diagnosed pleurisy and, on pneumonia supervening, had sent the patient to the local hospital. No beds being available, the patient was sent to another hospital, whence, when it became known that she was suffering from empyema, she was brought back to the original hospital. An operation was performed but the patient died next day. It seemed to be clear, from the evidence given at the inquest, that, if the house surgeon had known she was suffering from empyema, the patient would not have thus been transferred from one hospital to another. The coroner naturally devoted some time to eliciting the possible source of the inadvertence. As the message from the deceased's medical attendant had somehow miscarried through failure of communication between the admission department and the hospital staff, the coroner suggested that a message should be put on the stretcher, or pinned on the blankets, in such cases in order to ensure that the patient would be admitted and operated upon promptly. A verdict of "death by misadventure" was returned.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Cmdrs. O. D. Brownfield and W. A. Jolliffe to *Pembroke* for R.N.B.; A. E. P. Cheesman to *St. Angelo*; E. R. Sorley and J. V. Williams to *President* for course; J. S. Elliot to *Pembroke* for R.N.B. and to York; and R. R. Baker to *Cairo*.

Surg. Lt.-Cmdrs. E. H. Rampling to *Drake* for R.N.B.; G. Phillips to *Ganges*; C. B. Nicholson, T. F. Crean, E. T. S. Rudd, and W. P. E. McIntyre to *President* for course; J. M. Sloane to *Greenwich*; E. E. Malone to *Pembroke* for R.N.B., and L. P. Spero to *Victory* for R.N.B.; J. J. Mason to *Bee*; and M. A. Graham-Yooll to *Pembroke* for R.N. Hosp., Chatham.

Surg. Lt.-Cmdr. (D) F. W. Watt to *Pembroke* for R.N.B.; and S. E. Brown to *St. Angelo* for *Maine*.

Surg. Lt. J. W. Oliver to *Pembroke* for R.N. Hosp., Yarmouth; A. J. Glazebrook to *Shropshire*; and J. W. Caswell to *Victory* for R.M. Infirmary, Portsmouth.

W. R. Knott and A. J. Staple to be Surg. Lts. (D).

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt.-Cmdr. E. F. St. J. Lyburn to *Drake* for R.N.B.

Surg. Lts. K. Forsythe to *Drake* for R.N.B.; J. N. Matthews to *Iron Duke*; and W. E. Pycraft to *Victory* for R.N.B.

R. E. C. Copithorne entered as Proby. Surg. Lt.

ARMY MEDICAL SERVICES

Col. J. B. Grogan (late R.A.M.C.) retires on ret. pay.

Lt.-Col. A. L. Stevenson, from R.A.M.C., to be Col.

ROYAL ARMY MEDICAL CORPS

Maj. J. G. Ronaldson, M.C., to be Lt.-Col.

Capt. J. C. Gilroy is secd. for service under the Colonial Office.

The undermentioned Capts. to be Majs.: F. P. M. Anderson, P. F. Palmer, D. Bluett, and C. E. Eccles.

Short Service Commissions: Lt. D. N. Keys to be Capt.

REGULAR ARMY RESERVE OF OFFICERS

Maj. R. G. Gayer-Anderson, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

SUPPLEMENTARY RESERVE OF OFFICERS

Lt. R. L. Walmsley, from Supp. Res. of Off., D.W.R., to be Lt.

ARMY DENTAL CORPS

Lt. W. F. Finlayson to be Capt.

Short Service Commissions: The following Lts. to be Capts.: C. W. Upton and J. H. Sherwen.

TERRITORIAL ARMY

Capt. D. O. Macdonald having attained the age limit relinquishes his commission and retains his rank.

Lts. W. Heard, D. H. Young, and R. J. V. Battle to be Capts.

John Brock Bishop (late Offr. Cadet, Oxf. Univ. Contgt., Sen. Div., O.T.C.) to be Lt.

William Gordon Brander (late Offr. Cadet, Univ. of Lond. Contgt. (Med. Unit), Sen. Div., O.T.C.) to be Lt.

TERRITORIAL ARMY RESERVE OF OFFICERS

Maj. R. O. Ward, D.S.O., M.C., relinquishes his commission and retains his rank, with permission to wear the prescribed uniform.

ROYAL AIR FORCE

Wing-Cmdrs. T. Montgomery to Headquarters, Bomber Command, Uxbridge, for duty as Deputy-Principal Medical Officer; A. E. Barr-Sim to Headquarters, Bomber Command, Uxbridge, for duty as Medical Officer; and E. C. K. H. Foreman to Headquarters, Training Command, Market Drayton, for duty as Medical Officer.

Squadron Leaders R. L. C. Fisher to Headquarters, Bomber Command, Uxbridge, for duty as Medical Officer; and R. W. White to Superintendent of the Reserve, Hendon, for duty as Medical Officer.

Flight Lt. J. F. S. Wiseman is transferred to the Reserve, Class D.

Flying Offrs. E. J. Moynahan to No. 3 Flying Training School, Grantham, on appointment to a short service commission; and W. J. Fowler, to R.A.F. Station, Hucknall.

E. J. Moynahan is granted a short service commission as a Flying Offr.

Dental Branch.—Flying Offr. K. G. Swiss is promoted to the rank of Flight Lt.

DEATHS IN THE SERVICES

The death occurred in India on August 3rd of Lt.-Col ROBERT KNOWLES, C.I.E., I.M.S. He was the son of the late Rev. J. Knowles, and was born in October, 1883. Educated at Mill Hill School and Downing College, Cambridge, and St. Mary's Hospital, London, he qualified M.R.C.S. Eng., 1907, and entered the Indian Medical Service in February, 1908, and was in military employ till April, 1912; attached to Bombay Bacteriological Laboratory in August, 1916; director of the Pasteur Institute, Shillong, in December of the same year; officiating professor of pathology, Medical College, Calcutta, in March, 1920; secretary of the School of Tropical Medicine, Calcutta, three months later, and professor of protozoology at the School in November, 1921. He was the author of Introduction to Medical Protozoology, 1928; and had written on malaria with special reference to Indian conditions. In the Birthday Honours of June, 1935, he was awarded the C.I.E. He was then described as the late editor of the *Indian Medical Gazette*, but his chief interest was research work. He married Evelyn, daughter of Dr. W. Montgomery, and had three daughters.

The death occurred on July 27th in London of Major WILLIAM ADOLPHUS JUSTICE, I.M.S. (retd.). He was born in May, 1870, and qualified M.B., C.M. Aberd. in 1893, and D.P.H. Camb., 1897. He entered the I.M.S. in January, 1902, becoming captain three years later, and was in military employ till July, 1906, when he was appointed deputy sanitary commissioner and inspector of vaccination, Madras, and sanitary commissioner in February, 1912, retiring eight years afterwards. He had lectured in hygiene and bacteriology in Madras Medical College.

GRAINS AND SCRUPLES

Under this heading will appear week by week during the summer the unfettered thoughts of doctors in various occupations. Each contributor will be responsible for the section for a month; his name can be seen later in the half-yearly index.

FROM A LONDON SURGEON

WHEN the sailing events in the Olympic games are decided this week in Kiel harbour, Britain will be represented in Star boats by Keith Grogono and Rupert Welply, students at the London Hospital. As a pair they are the best open boat sailors in this and possibly in any country. They are both veterans at the game, strong, keen, and expert, and they have developed coöperation in seamanship and race tactics to a degree that is seldom seen. They may win, they will certainly do well; but in any case they will carry our good wishes with them, because they deserve it, because they are our fellow countrymen, and because they are members of our profession.

We can rarely point to an outstanding figure in the world of sport and claim him as a colleague. Most of us will remember contemporaries who attained high honours at some game while they were at hospital, and who might have reached the highest had they been able to devote themselves to it with the single-minded concentration of von Hütchler in sailing and Bobby Jones in golf. Gillies, Bromley, Hindmarsh, might all have been champions had they worked as hard on the links as they do in the operating theatre.

* * *

Medicine has become a group of professions rather than a single one. The many committees which have considered the curriculum during the last five years have all been harassed by this increasing complexity; on the one hand by the demand of fresh subjects such as radiology, psychological medicine, and manipulative surgery for admission, on the other by the clear desirability of shortening the whole course so that it shall encroach less rather than more on the school years and allow a continuance of that general education which is of paramount importance to the future doctor, and of simplifying it so that it shall permit him during its study to keep his health and human contacts. A possible solution of these difficulties, one that may yet be forced upon us, is the projection of a relatively short and simple qualifying course, one that shall provide a common groundwork to all branches but a complete study of none. The examination following such a course would be the gateway not to practise but to a further period of post-graduate study, on whose completion a final test would give the right to registration and to practise in that branch.

* * *

Among such specialties, general practice would hold the most important place. The practitioner must be, as his plate sometimes announces, "physician, surgeon, and accoucheur." He must know much of surgery, but he requires a different outlook and a different training from that of the specialist surgeon. He must have a thorough understanding of the surgery of trauma and sepsis, of surgical diagnosis in all its aspects, and particularly that of the acute abdominal emergency, and of the possibilities of operative treatment in all conditions. He needs no training at all in major operative surgery, and would probably be better without the haphazard introduction he now receives. It has long been apparent that the time spent by the undergraduate in the operating theatre is not merely a waste of his time but harmful to himself and the teaching of the subject. It is a waste of time because it takes him from clinical and laboratory work which at this stage is more useful to him, and because it introduces him to a highly technical subject whose principles he cannot yet understand, and whose details he can rarely see. It is harmful because it dilutes to a degree that makes it valueless experience which in continuous form is invaluable to the post-graduate, and because it limits the surgeon to methods and undertakings suited to unskilled assistance.

Routine operative surgery needs no more knowledge or skill than general practice, and should be no better remunerated, but it is a whole-time job, requiring special training and constant exercise and study. It is, even in its simplest form, a subject for post-graduate study, and the practitioner who undertakes it without such study is a mere charlatan. He cannot, in this country at any rate, put forward the plea of necessity, for there are few places indeed where a patient cannot be placed within the hour under the care of a working surgeon. Such a man may be practising by himself in a small town, or may be a member of a large partnership; what matters is that he is a serious workman and not a dilettante. The training for such a surgeon demands a minimum of two years' post-graduate study, which, should the simplified curriculum come to pass, would include a further course in anatomy. It would embrace resident posts in busy general hospitals, giving opportunities for the care of surgical cases, for training in diagnosis, and for apprenticeship in technical methods. Should his time enable him to take the fellowship and do a spell as registrar, the surgeon will benefit permanently from the experience, but without them he can do good journeyman work provided that he makes it his sole business.

But the training I have in mind is that of the man who is anxious or destined to be more than an operator, to do more than repetition work; of one who will train others, add to the store of knowledge he has received something of his own, and take his place in succession to Hunter and Hilton, Pott and Paget, Lister and Lane. Whereas a man can be fitted for routine surgery in two years, he will in this last case require ten for his preparation, if indeed it is ever finished.

What sort of a man do we wish to produce? The six names I chose from the past were paired, less for alliteration than because they represent three great movements that have advanced surgery. The first two preached the study of function, Hunter in its broad lines, Hilton in its detail; the second two were students of the clinical aspects of disease; the third laid the foundations of modern surgical technique, Lister the discoverer of antisepsis, Lane the pioneer of asepsis. It is more difficult to judge contemporaries, to say which of them are great. Were any gathering of surgeons, themselves mature, asked to answer the question with a list of two dozen names, every list would certainly contain those of Wilkie, Fraser, Morley, Grey Turner, Trotter, and Gordon Taylor. There are others who would just as surely be included, but to leave eighteen places unfilled is less

invidious. I have again chosen three pairs, almost at random, to represent Scotland, the north of England, and the south. All are so secure that my choice can neither suggest flattery nor arouse malice. Here then we have a dozen men from different epochs and different towns, all great and all entirely different. How can we find their successors?

* * *

In judging a surgeon, five aspects of his work, at least, must be considered: *knowledge*—of anatomy, physiology, pathology, surgical history, contemporary literature, and the work of other surgeons; *wisdom*, that is clinical sense and sound judgment based upon accumulated experience; *originality*, the power to build scattered observations into something new; *ability to instruct* others by word of mouth and pen; and *technical operative skill*. Great surgeons possess all these qualities in some degree, but many who would not receive full marks on every count are yet secure of immortality. Lister was a poor operator, Lane an indifferent speaker and writer.

The relative importance that has been attached to the development of these different aspects of a surgeon's work in the scheme of his education has varied from time to time. Till the war the young aspirant followed a well-trodden path that developed his knowledge and teaching ability to their fullest. He spent his waiting years as a registrar, daily instructing large classes of students in his chief's wards, or as a demonstrator of anatomy. He was seldom allowed to operate, and even after his appointment to the staff he received no beds in his own right till he became a full surgeon. He had neither the time nor the facilities for research. The surgeons from 1905 to 1915 were wise and gifted clinicians, teachers whose like is now heard only in Edinburgh, Manchester, and Liverpool, writers of text-books which can be brought up to date, but not bettered, to-day. On the other hand they produced few noted advances, and their technique was, on the average, mediocre.

* * *

At the present time, swayed in great measure by the lessons of casualty clearing station surgery, which produced operators of consummate dexterity and artistry like Charles and Lockwood, we encourage our young men to operate from an age and to an extent that may possibly be harmful. They develop a skill that is a joy to watch, but they are apt to be slick and spectacular rather than careful and atraumatic, dreadfully prone to give the operation itself an unduly important place in the scheme of treatment, and to advise it without sufficient thought. We certainly work them too hard, neither giving them sufficient time in their round of duties to keep abreast with surgical literature and undertake research, nor allowing them those fallow periods between spells of activity in which ideas germinate and the best work is produced. We encourage them to teach, but the probationary period in the dissecting-room is too often omitted. Our younger generation of accepted surgeons are first-class technicians, good examination coaches rather than good teachers, authors of text-books which are admirably clear and beautifully illustrated, but which bear evidence of scissors and paste rather than of original ideas and mature thought. Realising these defects in our methods hitherto, the men who influence education to-day are particularly concerned to encourage original thought and inquiry in the coming generation of surgeons. The many travelling and research fellowships recently endowed, the munificent foundation of Buckston Browne, the welcome tendency of some hospitals, notably St. Bartholomew's, to encourage part-time experimental work among their registrars, all these are evidence of this liberal trend.

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Regarding this problem of the education of a surgeon in greater detail, we see that it has three phases: we must find him, we must qualify him, we must train him. These three aspects of schooling are at the present time fulfilled by the primary fellowship, the final fellowship, and the series of post-graduate appointments which are open to those who have passed the first two.

The primary fellowship is perhaps the most extolled and execrated examination in the world. Is it necessary at all? Its alleged purpose is to ensure a thorough knowledge of anatomy and physiology in those who intend to take up surgery as a career. Did it serve this purpose it might be supported, but as it is now conducted it is merely a guarantee that the candidate at some period of his life, possibly distant, has studied these two subjects very thoroughly and shown evidence of a memory of phenomenal agility. Because the examination is known to be an incredibly difficult one for those who have left their medical school studies behind them for some years, the great majority of students decide to sit for it, if they do so at all, just after they have finished their qualifying course in these two subjects, that is before they have started their clinical studies, before they have any idea whether they wish to be surgeons at all. Coming at this stage, it has several unintended and harmful effects. It modifies, we might almost say interferes with, the anatomical teaching of other students, which, but for this artificial test which many of them have in view, might be conducted on simpler and more practical lines. It takes many of the best men for a year or more from the even flow of their studies, not because they necessarily intend to become surgeons, but because they recognise in the primary fellowship a distinction of honours standard, whose possession will help them to secure appointments. It forces many of them in later years to sit for the final, not because they have any real bent for surgery or are likely to make good surgeons, but because they have passed the first and most difficult part of the examination and feel bound to complete it.

The standard of the primary has been forced up to one of great severity by the tremendous number of candidates who, spurred by these varied motives, present themselves twice a year for examination, and it is fortified by the inclusion of an immense amount of trivial detail. It calls for a detailed memory rather than real knowledge, a type of memory that many of the best brains do not possess, but that, on the other hand, is seen in the inmates of institutions for the feeble-minded who can add up columns of five figures in their heads and remember the date of every event in the last thousand years. It demands a human version of the performing pony. The primary fellowship is an impossible obstacle to the more thoughtful type of student, whose mind is creative rather than retentive, and to any man of more mature years. A test that excludes such men from surgery is an unhappy mistake.

Some eliminating or selective machinery is necessary to ensure that our surgeons are picked from men of proved worth, for were the final examination unguarded by any such barrier, the many candidates who might present themselves could not be assessed

thoroughly and fairly. Such a test should eliminate the second raters, but it should also select those of ability of every kind, not merely the expert examinees such as I have been, who have learned to pass off inferior goods by expert salesmanship. It need not be upon the lines of the present one, nor even enforce the same subjects, for anatomy and physiology must in any case be learned again.

* * *

Preliminary sorting appears to be desirable in any qualification which ranks as an honours degree and is unnecessary for practice, and a good case could be made out for a common eliminating portal for all higher examinations, including the final fellowship, the membership of the Royal College of Physicians, and possibly for doctorates and masterships as well. Such a trial would allow several alternatives. It would include severe tests such as the present examinations in anatomy and physiology, preferably modified by the elimination of detail and the addition of more questions of the essay type. It would also include alternative papers in pathology, surgical history, and modern languages. The possessor of a first class in any honours school, including literæ humaniores, would be excused the examination, and one who had been in practice for ten years would be allowed to present a thesis of M.D. standard in its place.

The final fellowship examination would be open to little criticism, but for the size of its entry list, which excludes a thorough and personal test of each man. A revised preliminary trial, which admitted a smaller number of more carefully chosen candidates to the final, would correct this fault. Even now the examination works well. It rarely ploughs the wrong people, but it does sometimes pass the wrong ones: the plodder, because examiners are human, and when he comes up for the eighth or ninth time, no wiser, but a little older and a deal more pathetic, he picks up a sympathetic mark here and there which just lifts him over the fence with a rattle of twigs; the self-confident part-trained youngster, because they like the outside of him, and have not the time to get through it. The masterships in surgery of Oxford, Cambridge, and London hold the reputation they do because the entry is small and the pace leisurely. The examiner sees each candidate long enough to size him up impartially, to take him over each topic to its conclusion, to allay his nervousness, and call his bluff.

* * *

Many would abandon the practical test in operative surgery, on the grounds that an operation on the dead body is totally different from one on the living, calculated to upset the candidate rather than to test his skill. They would substitute written evidence of a number of operations performed by the candidate, and a more extended discussion on surgical methods. But while an operation on the cadaver is inferior as a test to one on the living, it is the only possible one under examination conditions, and, rightly used, will convey information that cannot otherwise be obtained. No fair examiner will expect a candidate to repair a hernia neatly in wasted and formalin-hardened tissues; but he can see how he sets about it and handles his tools, and he can use the steps as a basis for practical questions which would not otherwise be asked. He learns even more if he sets some simple but unstereotyped task, such as the removal of part of a bone for a giant-celled tumour. The true surgeon thinks of the important structures lying around, and plans an approach either to expose and retract them, or to avoid them; the bungler sets to, and finds his obstacles as the Chinese pilot finds the rocks.

* * *

The alternative, a certificate of proficiency, is of little value, for no man has the courage to say that one who has worked hard for him is incompetent. Even guarded sarcasm, such as "the hospital that gets Mr. Smith to work for them will indeed be fortunate" is uncommon. Truth would often demand some such statement as "I have watched Mr. A. perform 50 operations upon my patients with alarm and misgiving; their recovery is a testimony to providence rather than his skill, and I am convinced that his talents, if any, lie in the direction of non-manipulative treatment." Instead the certificate will read, "Mr. A. has performed 50 major operations to my satisfaction." Let us then keep operative surgery; rightly used it is perhaps the most valuable part of the examination.

* * *

It is in the final stage, that of post-graduate study, that our opportunities and responsibilities are greatest, for during these stages the surgeon, now selected and approved, is finally made or marred. What sort of man is the surgeon we wish to produce?

In this question, which all our educationists are asking, lies the fundamental error of humanity in authority. A surgeon will be what he has it in him to be, and we do more harm than good by trying to mould him to an ideal of our own casting. Man asks many services of the dog. He asks him to befriend his children, guard his house, ward off his enemies, pursue the fugitive; to overtake the swift quarry, nose out the wily one, dig out the burrower. Through the centuries he has chosen his dogs for what they are, and the centuries have evolved types admirably suited to his various needs. But when to-day he sets out to produce a dog which shall not merely do something, but correspond to certain measurements and beauty standards, he degrades the canine race. It is only necessary to compare the undistinguished but lovable and intelligent fox terrier of the type immortalised by His Master's Voice with the flat-headed, straight-legged, brainless monstrosity of Crufts, to appreciate the dangers of planned creation.

True education is arranged experience. Men learn, that is absorb into the fibre of their being, not what they are taught, but what they find out for themselves, or think they do. We can teach them best by so planning their study that they shall meet experience in an order in which it is intelligible, by firing them with our enthusiasm, and by helping them when puzzled.

The requirements of a surgeon have already been discussed—wisdom, eloquence, craftsmanship, knowledge, invention. We can teach these by giving our young men opportunities to acquire them: wisdom by clinical study and discussion, eloquence by teaching, writing, and public speaking, craftsmanship by operative practice. Knowledge is the result of study, willingly undertaken, of reading, travel, attendance at meetings, visits to other centres, membership of small clubs of contemporaries. Our registrars are willing, but they are often overwhelmed with routine work, struggling to support a young family, burdened with anxiety for the future. If we give them reasonable leisure, remuneration, and security of tenure,

we can trust them to work. The development of originality is a most difficult question, one that in these days of educational theories is perhaps stressed unduly. Originality and research are often coupled, as if they were synonymous; they are not the same, rather are they in many ways opposite and incompatible. Originality, vision, imagination, are of the soul, research is of the mind. Originality runs ahead with her eyes on the clouds; she may trip up or she may find paradise. Research plods with her eyes on the road; to her the journey is more than its end. Originality is inspiration, research is constant inquiry. Research may produce original results, that is it may unearth facts which have not hitherto been known, but it cannot discover originality in the man who undertakes it if it is not there to be developed. On the other hand originality may never lead to research, from lack of time or opportunity: it may be killed by research; but it will provide the stimulus to research in others.

* * *

Research work is undertaken for a variety of reasons, some good, some reprehensible; it is done under orders by the laboratory executive, as a livelihood and a justification for existence by the timid and plodding, as a means of self-advertisement by the opportunist, as a mental training by the ambitious and far-sighted. This last motive is wholly admirable, and inspires work such as that now being undertaken by young men in Edinburgh, Manchester, at the Buckston Browne farm, and in many other centres. This work is all the more valuable because it is being conducted on problems which these men have already encountered, and because it is an incident in their training. There does not, however, appear to be any likelihood that the lot of these researchers will be cast permanently in the laboratory; they are the leaders of the next generation, men who will be the better able to inspire and direct their juniors because they have done this work themselves. Where we find young men with problems to settle, or willing to solve our problems for us, let us give them every help and encouragement, but let us keep them at the same time in the field of clinical surgery where the inspiration for all research of importance arises. And do not let us force others to follow them, look askance on those who do not ask to do so, or value unduly those who simulate the desire. The real call to invention arises in the problems of practical work and many surgeons develop their imagination late. Charles Ballance and Lawford Knaggs did their best work in their seventh decade.

What surgery needs is the idea that starts research rather than the research itself. We honour Pasteur and Edison, but we must remember that the detail of Pasteur's work was done by a large team of laboratory assistants, and that Edison's inventions were translated into fact by mechanics. It should be possible in Britain, as it has been for many years in Germany and America, for the man with ideas to call upon a research workshop to carry out his experiments and answer his questions for him, just as the modern author gives his typist a box of dictaphone records to turn into a novel or as Charles Nicholson hands over the lines of *Endeavour* to a trained draughtsman for fairing and completion.

* * *

Coming back to our original thesis, we find the problem to be this. The only standard we can adopt as one to which we would train our neophytes is that of the great surgeon. We can recognise such a man when we meet him, and we can analyse his qualities. But in each we find these qualities blended in varying degrees. Each is an individual, and his individuality has developed as a ripening of the qualities in which he excels. We can point out these standards, and we can give our juniors the opportunity to exercise these qualities to the fullest. But we cannot fix a particular type and say "this shall be the surgeon of the future." We can however influence coming generations by devising machinery to ensure that the best men, whenever and wherever they appear, shall get the best jobs. Many a young man to-day hesitates to follow the star that beckons, because he fears where it may lead him. He knows that if he goes abroad, if he works at another hospital, if he undertakes research and fails to produce some striking results, he will be forgotten and passed over in favour of a less gifted contemporary who has remained behind and piled up merit by conscientious hack work. Such fears discourage originality, and force men to continue in posts which have lost their educative value.

We might then suggest a policy for the hospital that wishes to train a generation of surgeons that will not merely serve it, but will carry its name throughout the world. "Pay your young men well, and respect their independence. Give them at least two whole days in the week unoccupied. Let them use this time as they will, but help them with suggestions if they need them. Do not keep any junior in the same job more than two years; turn him out, but do not lose sight of him, for the reject of to-day is often the star of to-morrow. When a staff vacancy occurs, throw it open: first to all men of your own school, whatever their age, whether they be registrars, working at research, travelling in America, attached to another voluntary or council hospital, or in general practice, and select them on merit alone. If you cannot say with certainty that one of these is of first-class calibre, open your doors to candidates from other hospitals." Many fear the adverse effect of the open door upon their own medical school. Were the policy universal, none would suffer. Good men would get posts according to their merits rather than on chance vacancies, and would be spared that dreary wait that maketh the heart sick. The hospitals that have adopted such a policy have rarely regretted it; Sampson Handley and Bankart at Middlesex, Dunhill at St. Bartholomew's, Tidy at St. Thomas's, Witts at Guy's, Broster at Charing Cross, Donald at the London, have all added to the lustre of the school wise enough to welcome them.

The eventual outcome of such a policy would be the abolition of patronage, the placing of all appointments in the hands of a body composed of representatives of the colleges and universities, before whom the needs and wishes of the particular institution concerned would be placed by coöpted representatives.

CONGRESS OF SYNTHETIC BIOLOGY.—A congress of synthetic biology, which doctors, biologists, psychologists, and philosphers are invited to attend, will be held at Marienbad from Sept. 16th to 19th. Members of the committee include Prof. L. Aschoff (Freiburg i. Br.), Prof. A. Ascoli (Milan), Prof. E. Bleuler (Zurich), Prof. Th. Brugsch (Halle, a. Sa.), Prof. J. Holmgren (Stockholm), Prof. H. J. Jordan (Utrecht), Prof. Othmar Spann (Vienna), and Prof. E. Starkenstein (Prague). Further information may be had from Prof. Sihle, Elizabetesiela 63, Riga.

PUBLIC HEALTH

THE OVERCROWDING SURVEY

In the exercise of his power under Section 1 (1) of the Housing Act, 1935, the Minister of Health called upon local authorities to submit reports on overcrowding in their areas by June 1st, 1936. About half the returns were made by that date and all but a very few had been received by the end of June. When the magnitude of the new task thrown on local authorities is realised (every working-class house had to be inspected and all those which appeared to come within the range of overcrowding prescribed by the Act had to be measured) their performance is highly creditable. No less commendable is the feat of the Ministry in issuing an elaborate analysis of the reports before the end of July.[1] It relates to 1536, or 96 per cent., of the authorities in the country, including 99 per cent. of the population.

WHAT IS OVERCROWDING?

Caution is needed in interpreting these statistical returns. There has been some variability in the class of house chosen by different authorities for survey, in the decision as to what is a "room" in the sense of the Act, in the recording of multiple tenancies as single occupancies or more than one, and in the extent to which actual measurements have been made of houses. The Ministry do not think these differences of sufficient magnitude to affect the value of the survey to any substantial extent.

The basic standards, however, must be remembered in examining this report. They take into account several factors—e.g., the possibility of separating unmarried members of the sexes over 10 years of age, the number of "units" in proportion to the number of rooms in a house, and the actual size of the rooms. The first of these standards can hardly be taken seriously for it is applicable only to single-roomed houses, on the assumption that adolescent or adult males and females can always be separated in larger houses. Thus a married couple with two adult sons and two adult daughters could, theoretically, live in two rooms without sex-overcrowding, because all the males could sleep in one room and all the females in the other. As a matter of fact, the question would never arise in this extreme form, since the standard of room accommodation per unit would place such a house in the category of overcrowded, as being occupied by twice the number of persons permitted. Throughout the whole country the number of single-roomed houses returned as overcrowded solely in relation to sex separation was less than 500. More serious is the fact that a kitchen, ordinarily used as a living room, and any other living room are treated as being available for sleeping purposes; so that in a four-roomed house, each room being of 110 sq. ft. in floor-space, scheduled as adequate for 7½ persons, a married couple with one grown-up son, three grown-up daughters, and a child under 10, would be really though not statutorily overcrowded in sleeping accommodation if they desired to retain a separate kitchen-living-room and yet keep the adult sexes sleeping apart.

The standards are even more gravely unscientific in treating children under 10 years of age as half units and those under 1 as not existing at all. Thus in a three-roomed house, two rooms of which measure 110 sq. ft. and one 70 sq. ft., it is statutorily permissible to house a married couple, two others over 10 years of age, two children over 1 but under 10, and an infant, these seven individuals being reckoned as five units. The Registrar-General's findings as to the age-groups of the population among whom sickness seems to be most closely associated with overcrowding, and Spence's observation of the extent to which malnutrition in children is a sequel of infection, cast some doubt upon the value of standards which attach relative unimportance to the young.

GEOGRAPHY OF OVERCROWDING

That the standards, however, have at least the advantages of bringing the problem within manageable limits is proved by the result. Of 8,924,523 dwellings inspected only 341,554, or 3·8 per cent., have been found to be overcrowded in the sense of the Act. As the Census returns led us to expect, there are wide differences in geographical distribution. Forty per cent. of the overcrowded families are in the administrative county of London and the geographical counties of Durham and Northumberland, although, in the aggregate, these areas contain only 16 per cent. of the total population. In London itself the percentage of all families who are overcrowded varies from 17·2 in Shoreditch, 15·4 in Stepney, and 15·2 in Finsbury, to 2·5 in Hampstead, 2·2 in Wandsworth, and 1·7 in Woolwich. The London rates may perhaps be regarded, in part at least, as indices of the drift of the poor population to that city in search of work; Durham, with 12·0 per cent. of its families overcrowded, and Northumberland, with 11·2 per cent., probably show up better than they would have done ten years ago. The administrative problems of the two types of area are therefore not quite the same.

The percentages of families overcrowded march pari passu with urbanisation. In the metropolitan boroughs (including the City of London) it was 7, in the aggregated county boroughs 4·2, in the non-county boroughs and urban districts 3·0, and in the rural districts 2·9. Within each of these groups, however, as in London, there are wide differences. When the geographical counties (including their associated county boroughs) are listed in order of percentage overcrowding, it is perhaps significant that 12 of the 13 Welsh counties appear in the upper half of the series, for it is in them as in London that young adults are figuring heavily in the toll of tuberculosis.

Council houses throughout the country generally are more overcrowded than those in private ownership, the percentages being 5·1 and 3·7 respectively. This may be explained by the urgency of relieving the worst cases of overcrowding of large families through the agency of council schemes during the past 15 years. Usually in areas where there is much general overcrowding the proportion of overcrowded council houses is correspondingly high, but this is not universally true. Curiously, where the reverse is the case, or where the difference in the degree of overcrowding of council and private houses is slight, the authorities concerned are often included in the depressed areas. This may be due to the inability of unemployed families to meet even the subsidised rental of council houses, or to outward drift of the active members of families which have been most vigorous in seeking the better accommodation they

[1] Ministry of Health: Housing Act, 1935. Report on the Overcrowding Survey in England and Wales, 1936. H.M. Stationery Office. 1936. 8s.

afford. There is, however, more overcrowding of council houses (as compared with private) in South Wales than in the North-East, a fact which may be explained by the liberal policy of the councils of the former area in relation to rents and other social assistance. As suggested above, in reference to Durham and Northumberland, the depressed areas are faced with a difficult administrative puzzle. Their population is rapidly declining. To what extent are they justified in waiting for this movement and the falling birth-rate to bring relief to the overcrowding of houses? In the North-East the case seems to be too bad to justify a simple policy of laisser-faire. In some parts of South Wales there is something to be said for it, when we remember the other heavy financial burdens the area is carrying.

The report treats every tenancy, so far as it is known, as separate. No information is given as to the proportion of families living two or more to a house constructed for single tenancy. In London and some other towns it is known to be high. For this reason and because of the new definition of a "unit" within the family, the figures are not strictly comparable with those contained in the Census reports. For practical purposes the survey may well serve its purpose of indicating an attainable housing programme for the partial relief of overcrowding, estimated roughly by the Ministry at 200,000 houses. But the Census reports will still give the better data for those who wish to correlate housing and health.

L.C.C. HOSPITALS AND HOUSES

AT its meeting on July 28th the London County Council approved proposals for spending more than £365,000 on improvements and additions at hospitals, and £687,000 on new dwellings. The changes to be made in the hospitals include:

(1) The electrical rewiring of the Brook Hospital (£10,400).

(2) The conversion for the chronic sick of a block at Hackney Institution at present used by able-bodied men. This scheme, which will cost some £34,700, is part of the general scheme for accommodating the chronic sick in hospitals and removing them from public assistance institutions.

(3) A new maternity block at Lambeth Hospital (£55,700). It will provide 70 beds and 71 cribs, as compared with 32 beds in the present maternity wards. The latter will accommodate 50 general patients when the new block is available.

(4) A new ward block at Mile End Hospital, costing nearly £74,000 and accommodating 70 maternity beds and 31 general beds.

(5) Improvements and additions, costing about £14,400, to St. Margaret's Hospital, Kentish Town.

(6) A new five-storey nurses' home at St. Nicholas's Hospital, Plumstead, with bedrooms for 100 nurses and 23 sisters. The scheme will cost nearly £60,000. Two tennis courts will be provided.

(7) Additional isolation accommodation at the South Eastern Hospital, New Cross. This scheme, which will cost just over £116,000, follows the Council's policy of increasing the proportion of isolation accommodation at infectious hospitals to one-third of the total accommodation.

The new dwellings will take the form of flats accommodating more than 6000 people, and the scheme includes the development of 20 acres in Pembury-road, Hackney, at a cost of £439,000, and of 4½ acres at Peckham Rye. Within the past few weeks the Council has considered proposals to spend more than £2,500,000 on housing.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JULY 25TH, 1936

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1654; diphtheria, 920; enteric fever, 53; pneumonia (primary or influenzal), 385; puerperal fever, 36; puerperal pyrexia, 116; cerebro-spinal fever, 13; acute poliomyelitis, 24 (last week 11); encephalitis lethargica, 3; dysentery, 13; ophthalmia neonatorum, 104. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on July 31st was 3118, which included: Scarlet fever, 881; diphtheria, 727; measles, 508; whooping-cough, 463; puerperal fever, 11 mothers (plus 5 babies); encephalitis lethargica, 284; poliomyelitis, 0. At St. Margaret's Hospital there were 16 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 122 great towns, including London, there was no death from small-pox or enteric fever, 11 (1) from measles, 1 (0) from scarlet fever, 13 (2) from whooping-cough, 14 (1) from diphtheria, 37 (11) from diarrhœa and enteritis under two years, and 8 (2) from influenza. The figures in parentheses are those for London itself.

Hull reported 2 deaths from measles. There were 3 deaths from whooping-cough at Birmingham and 2 each at Doncaster and Manchester. Birmingham reported 3 deaths from diphtheria and Hull 2. Liverpool had 3 deaths from diarrhœa and enteritis under two years, and Newcastle-upon-Tyne, Birmingham, Nottingham, and Stoke-on-Trent each 2.

The number of stillbirths notified during the week was 263 (corresponding to a rate of 39 per 1000 total births), including 37 in London.

IRELAND

(FROM OUR OWN CORRESPONDENT)

THE HEALTH OF CORK

THE annual report of the medical officer of health for the city of Cork for 1935 contains not only statistics concerning the health of the city, but also interesting views of the medical officer, Dr. J. C. Saunders, on some of the major problems of health. For some years past Cork had suffered heavily from a severe type of diphtheria, but this epidemic seems to have passed, the number of cases notified in 1935 (56) being just half that in 1934; in 1935 there were seven deaths. Dr. Saunders believes that the reduction both in incidence and in mortality is due to the campaign of immunisation which has been actively carried out in recent years. In the summer of last year there was a severe outbreak of diarrhœa which Dr. Saunders attributes to the unsatisfactory milk-supply of the city and to the presence of numerous pig-styes and stables near dwelling-houses in crowded parts of the city. Of 2729 children examined 6·97 per cent. showed evidence of rheumatism, of whom a third had heart disease; the corresponding figure in England is about 2 per cent.; Of 1158 deaths recorded during the year, 245 were due to heart disease, 133 to cancer, and 115 to pulmonary tuberculosis. Dr. Saunders regards the last-named disease as the most important health problem in Cork at the moment. He notes that patients present themselves for treatment at a relatively late stage: 57 per cent. of those who attended the tuberculosis dispensary last year were in Stage III., and 28 per cent. in Stage II. These figures are similar to those in recent years. He points out that improved housing does not of itself solve the problem of tuberculosis, and suggests that compulsory segregation may be found necessary.

Dr. Saunders considers that the ill-health and the consequent mortality of many young children are due to the physical inability of their mothers to rear them. The young girls go largely to industrial work and at the moment female labour is in demand. "To enter a factory would seem to be the general ambition, and the years which should have been spent in acquiring knowledge of what is, after all, perhaps, the most specialised job in the world are occupied in attending machines in, perhaps, the worst possible atmosphere for subsequent family life." No doubt this problem is not peculiar to Cork or to Ireland, but there are concomitant conditions which render the position more serious there than elsewhere. The average marriage rate is exceptionally low and the average marriage age late. Moreover this is not essentially a question of poverty for there are many countries in which the standard of living is lower but the marriage rate higher. It is well that medical officers of health should be alert to note and draw attention to the effect on health of such social conditions.

CORRESPONDENCE

AIR-RAID PRECAUTIONS

To the Editor of THE LANCET

SIR,—May I be allowed to make the following comments on the official statement from the air-raid precautions department of the Home Office published on p. 296 of your issue of August 1st?

1. "The scheme that has been devised" by the air-raid precautions department of the Home Office for the protection of the civil population of this country in case of hostile air attack should not, I consider, receive the support of the medical profession as a body because gas-defence is no more a function of the medical profession than it is of any other class of the community; and we must be careful not to allow ourselves to be led into the false position of assuming a responsibility that is not ours.

2. The only part of the subject that is special to our profession is the treatment of trauma to certain tissues by a group of special persons. The inclusion of instruction in this in undergraduate education should be *opposed:* (*a*) because the five years of the curriculum are so overcrowded that there is literally no room for the addition of a single class of one hour even of an optional nature; (*b*) because the inclusion of a minute specialism is contrary to all that is good in medical education.

3. As medical men each individual must be left to follow his own inclination, experience, and conscience, whether to take "the instruction of post-graduates" that is offered or to refrain from doing so.

4. As a matter of psychology it may be doubted whether the "measures" devised will "maintain the morale of the population." They may be as likely to diminish it.

I am, Sir, yours faithfully,

London, August 4th. T. B. LAYTON.

GRAINS AND SCRUPLES

To the Editor of THE LANCET

SIR,—A London Surgeon's polished and philosophical contribution to this column last week is a sheer delight to read; but like other polished grains it seems to lack something vital, and this is not surprising. With one or two distinguished and most happy exceptions, alliances between surgery and philosophy have not been satisfactory, and the reason why is not far to seek. By the time the surgeon feels the urge to talk of many things life's handicap has usually proved too much for him, for the atmosphere of pomp and circumstance in which a surgeon spends the greater part of his working day is a dangerous one. It is a moot point who suffers more from idolatry, the idol or the idolater, but one thing is fairly certain: a man must be of finer fibre than that of the normal, healthy, combatant, and humanitarian male to be the idol of his generation and to remain unspoiled.

These reflections are the natural reaction to the easy complacency with which A London Surgeon dismisses the medical contemporaries of his youth as failures, and relegates to an altogether inferior grade of mankind the despised research man. Are these facile judgments decorous in one who aspires to muse at large on men and matters? Are they even true? Can it be that A London Surgeon lacks something which should go to the make-up of a philosopher? What does life actually mean to him? His conception of the perfect life is a simple one, but how revealing! "Steady employment . . . reasonable remuneration, a succession of tasks sufficiently varied to demand constant care and provide constant interest . . . ," but why continue, for indeed the heart of the matter is here. One appreciates that essentially the surgeon's mind is a reflex one; he is trained to respond briskly to life's demands, to do lovely things, not dream them, all day long. For him the fight against disease is finished when something has been cut out or sewn in. His not to reason why, his but to do .... In fact, give him a succession of congenial stimuli and he is completely satisfied.

Now the despised research man is also responsive to external stimuli, but in addition he has developed the power of independent thought, and his conception of the battle of life and what is worth fighting for naturally differs from that of the surgeon; he sees, in fact, just tinsel where the other sees pure gold. The two points of view are, of course, incompatible, but while the medical researcher may dimly comprehend the activities of the surgeon, for, after all, his time is largely occupied with the study of the lower forms of life, it is doubtful if a surgeon, any more than any other highly motile organism, can appreciate the mind of the seer at the other end of the microscope. To the latter surgery is a "sad mechanic exercise" about which Hood might well have written a song had not a shirt provided him with an even more pathetic theme—

> Stitch! Stitch! Stitch!
> Gut and fascia and skin ....

As things are he realises that somebody must do the job, and it is only fair that the poor fellow should be richly remunerated as a compensation for the loss of those more intellectual pursuits which he altruistically renounces.

I enclose my card, Sir, and beg to remain, as your contributor does,

August 3rd. ANONYMOUS.

To the Editor of THE LANCET

SIR,—I believe that the great majority of your readers have much appreciated the various points of view set forth by your contributors to the articles under the above caption. I wonder how many of them will feel as I did when I read this week the contribution under this heading "From a London Surgeon." I cannot help thinking how much better

it would have been for him had his contribution not been both "unguided" and "uncensored." Every man has a right to his own opinion, but the arrogance, I could almost add ignorance, displayed in his remarks on research is what calls forth this protest. He states that:

"Research attracts the enthusiast before he meets it, and represents medicine in excelsis to the writers of plays and novels, but how much of it is varied, independent, and reasonably remunerated, *even granted that it is beneficent?* Most men who undertake research of set purpose do so less for a passion for discovery than from a knowledge of their own inadequacy for the battle of life, from a desire for some 'sad mechanic exercise, like dull narcotics, numbing pain.' Their chief qualification is an infinite capacity for taking pains, that definition of genius which is one of the most foolish aphorisms that have escaped oblivion. Their theses are but the working out of hypotheses brought to them in the rough."

For his own sake I hope that he is really ignorant of the work and lives of such men as Claude Bernard, Pasteur, Foster, Gaskell, Starling, and Bayliss. These men are dead but their works live after them, and are carried on by living men of equal merit to-day. All these men were content to devote their lives to the elucidation of physiological problems and their discoveries have been the basis of most, if not all, of the advances in medicine, surgery, public health, and sociology. It is true that none of them was "reasonably remunerated," but those who knew them were aware how content they were with their work, not desiring wealth or luxury, hardly hoping for security so long as they had the necessities of life for themselves and their families. There are hosts of research workers in many departments of science other than physiology whose discoveries have been responsible for most of the conveniences of our present state of civilisation. Their work has been forgotten by, or was never known to the multitude who profit by it, a notable example being wireless transmission. Does your contributor really think that pecuniary reward is a criterion of the value of the work done? If so, why do the fantastic salaries of film stars so greatly overshadow the earnings even of the most eminent of London surgeons? Your contributor may well be "despised by his fellows of brains and bottles as a mechanical craftsman" for, skilful though he may be, "as a hewer of wood and a drawer of water," it is obvious that he has no interest in the sources of either the wood or the water.

I enclose my card but, like the London Surgeon, I prefer to remain

"ANON."

TUBERCULOSIS CONTACTS

To the Editor of THE LANCET

SIR,—In an editorial article in your issue of July 25th you review the question of examination of tuberculosis contacts. A great deal of space is devoted to the importance of examination, but not a word is said about efforts at reducing the number of contacts.

So long as sanatorium accommodation for all patients willing to submit to treatment is so lamentably inadequate, we are bound to have a large number of contacts. It seems to me that the present policy of refusing sanatorium treatment to patients who are "too ill to benefit" is all wrong. These unfortunates who are in a highly infective condition are either refused admission or else sent back to their homes to infect their wives, families, and friends. What farmer would hope to eradicate thistles by trying to cut off the young seedlings while leaving the old stagers to blossom and seed untouched? Yet this is comparable with what we are doing with T.B. patients.

What is clearly needed is accommodation for all patients who are willing to avail themselves of it, as most of them are when the facts are laid before them. When a real effort has once been made to segregate all cases—early and advanced without favour—we shall see a fall in the incidence of the disease, and the problem of the contacts will have been very largely solved.

I am, Sir, yours faithfully,

LESLIE B. C. TROTTER.

Ledbury, Herefordshire, August 3rd.

CONVALESCENT SERUM FOR UNDULANT FEVER

To the Editor of THE LANCET

SIR,—I have recently been consulted in connexion with a patient who has suffered from undulant fever for five years. Various forms of treatment, including the administration of vaccines, have been tried without success. May I through your columns make an appeal for a donation of blood from someone who has recently suffered from undulant fever? The serum would be used in an attempt to produce a temporary passive immunity in the hope that as the passive immunity wore off an active immunity would take its place. I should be grateful if any reader who has recently had a patient who would be willing to donate blood for this purpose would communicate with me.

I am, Sir, yours faithfully,

H. J. R. KIRKPATRICK.

Royal Northern Infirmary, Inverness, July 28th.

MINER'S NYSTAGMUS

Dr. G. ARBOUR STEPHENS writes: In connexion with the statements made in your last issue by Dr. F. O'Sullivan regarding the blood pressure in cases of miner's nystagmus, may I recall what I said in 1932 on this subject?

"Nystagmus is also a disease which is closely connected with acute rheumatism and chorea—in fact, it may be described as 'collier's chorea.' All those who have had a large experience with colliers are fully aware that those who have the eye symptoms characteristic of nystagmus are also likely to give evidence of raised blood pressure, disturbed heart action and occasionally albuminuria.

"A large majority of the men who suffer from nystagmus are of a highly nervous temperament, whilst their physical constitution is not good. Many of these men, like those who suffer from beat-knee have inflamed gums, so characteristic of a disturbed metabolism, as well as a pallor and lack of energy due to want of good nourishing food.

"The raised basic blood pressure is followed by a disturbed exudation so that the nerve tissues are not fed satisfactorily and so do not exercise their usual control over the body movements.

"Since the introduction of tinned foods and preserved meats the feeding of the collier is much below what it used to be. Formerly the Welsh collier of whose habits I have a large experience used to live on good home-grown produce, with milk, eggs and cheese, but with the present cosmopolitan tendency of the age many of the Welsh colliers have fallen from grace. Today cooking is becoming a lost art, and the tasty but expensive and ill-feeding tinned foods are the chief features of the household board in a large number of homes, and it is from these homes that the army of nystagmus patients is recruited." (Heart and Spleen in Health and Disease. London: H. K. Lewis and Co., Ltd.)

PARLIAMENTARY INTELLIGENCE

INDUSTRIAL DISEASES AND ACCIDENTS

In the House of Commons on July 30th, on the motion for the third reading of the Consolidated Fund (Appropriation) Bill, Mr. RHYS DAVIES paid a tribute to the excellent work done by the factory inspectorate of the Home Office and said that the annual report of the Chief Inspector of Factories and Workshops was the most human document issued by any Government department. It gave a picture of nearly 5,000,000 men and women and young persons engaged in the daily task of the manufacture of a variety of commodities. It was a Blue Book with very black patches which bore witness to the very callous behaviour of some employers to their workers. This report presented the very worst picture of industrial conditions in factories and workshops which had come to light for the last decade. Indeed some of the illustrations would almost make him believe that the report related to India, Japan, or China and not to this country. The inspectors quoted a 13-hour day in a flour mill, 13 hours a day in rubber works, 80 hours a week on a day-shift in silk works, and a 72-hour week on night work in a silk works. In another part of the report it was stated that in the Midlands these long hours were worked by the least physically fit portion of the industrial population. The best workers went to the best employers and the weakest drifted to the factories with the longest hours and the least good conditions.

Now that there were so many more workpeople employed the standard of factory inspection in 1930 was not good enough to-day. With the best will in the world the number of factory inspectors was not sufficient to cope with the complaints received. The fatal accidents in factories and workshops in 1935 were 843 as against 785 in 1934, an increase of 58. The non-fatal accidents increased from 136,073 in 1934 to 148,853 in 1935, a jump of 12,780. It was one of the anomalies in the report that the claim was made that safety organisation was developing while at the same time the accident rate was apparently mounting up every year. Factory employment in this country was gradually becoming as dangerous as coal-mining. He was not sure that they had not reached a stage when speeding-up processes were such that human beings attending some of the new machinery were totally incapable of following the speed of the machines. Without using too strong words, this report indicated that something akin to industrial murder was proceeding in this country.

Referring to workmen's compensation the hon. Member said that only a comparatively small proportion of the premium income found its way ultimately into the pockets of the injured workpeople. The report stated that 63·76 per cent. of the premium income was paid away in workmen's compensation, and that this figure included legal and medical expenses incurred in the settlement of claims. Until they knew how much was spent on legal and medical expenses they would never find out the net amount of the premium income actually received by the injured workpeople, but he would be astonished if out of every £1 paid by employers in premium income for workmen's compensation more than 10*s.* found its way into the pockets of the disabled. Under the National Health Insurance Scheme 79 per cent. of the contribution went to the sick and disabled. He hoped that the day was not far distant when this important work would be taken out of the hands of private companies and put under a National Board with whom profit would not be the deciding factor.

Mr. DENMAN called attention to the opinion of the senior medical inspector "that the hours of employment of young persons should be substantially less than those permitted by the existing legislation." He hoped that the Home Secretary would realise the urgent need for dealing with the unregulated trades.

Mr. JAGGER welcomed the prospect of the introduction next session of a Factory Bill.

Mr. RILEY urged the Home Secretary to restrict the present possibilities of extended overtime and to consider the question of including in future legislation provisions for shorter working hours for all classes of workers, particularly young people.

Major PROCTER asked that provision should be made for the protection of employees in the cinema industry. In the large studios there might be found every day hundreds of men and women who were employed as film extras. If these people were injured on the floor of the studio they had no way of obtaining compensation under the Workmen's Compensation Acts, because they did not come under those Acts, or under the Employers Liability Acts, unless they could prove negligence on the part of their employers.

MEDICAL REFEREES AND THEIR DUTIES

Mr. CASSELLS said that according to the Command Paper the duties of medical referees included that of giving a certificate as to the condition of the workman, his fitness for employment, and as to whether or to what extent his incapacity was due to the accident. That should restrict the scope of the medical referee's investigations exclusively to medical facts, but practice had run roughshod over the Act of Parliament. At present to a large extent the duties of arbitrator or judge in the first instance had automatically devolved upon the medical referee. He had a medical report by a medical referee dated April 16th, 1936, as follows:—

> The condition of the said —— is as follows. He still complains of pain and stiffness in his back. He is wearing a brace and still is just as stiff as at the time of the last examination. I have had his spine X rayed. I do not consider that he is fit.

This was the point to which he (Mr. Cassells) took exception:

> Incapacity is due in the first place to the accident, and in the second place to lack of using his back sufficiently, while persisting in wearing the brace. I would put this case in the ratio of 65 per cent. accident, and 35 per cent. lack of use.

Here was a case where the medical referee had been permitted by the law to deal with the question of treatment which at all times had been recognised as being within the jurisdiction of the judge. In this case the man was acting on the advice of his own medical adviser, who told him definitely that in no circumstances was he to dispense with the use of the spinal brace. Yet when he went before the medical referee the advice of his own doctor was jettisoned, and the result was that the man's compensation had been assessed on the basis that his incapacity was due 65 per cent. to accident and 35 per cent. to lack of use. From his personal experience Mr. Cassells was completely opposed to applications to one medical referee only under any Act of Parliament. He was not casting aspersions of any kind on medical referees but—perhaps unwittingly, though unfortunately—medical referees who were employed repeatedly by insurance companies and employers obtained the employer's point of view, with the result that in any case where there was any doubt the workman did not get the benefit of it.

Sir ARNOLD WILSON said that many members had had experience of the work of medical referees, often with admiration, but sometimes with critical feelings, and they were nearly all agreed that a change must come. The matter was now under investigation by a Home Office committee.

Mr. TINKER said there was much dissatisfaction over the fact that there was only one medical referee to decide a man's case. If there were three medical referees, even though the result might be the same, the man would not feel that it was the prejudice of a

particular referee which had decided his case. He had known of cases where certifying surgeons were engaged by an employer in the same neighbourhood as that in which they were acting as certifying surgeons, and it was very difficult to get men to believe that a doctor acting for the employers could be fair with them when they applied for a certifying surgeon's note.

A man who had suffered from an industrial disease and was applying for another job had to state definitely whether he had had an industrial disease or not. If he replied in the affirmative he did not get work; and if he made a false declaration and afterwards contracted a disease he received no compensation. He wondered whether the Home Office could not agree that after a certain time had passed since the man suffered from an industrial disease he might not be required to sign. It was not the fault of the man that he had contracted the disease and it ought not to be a means of debarring him from employment.

Mr. SHORT spoke of the value of Dr. E. L. Middleton's Milroy lectures for 1936, published in THE LANCET of July 4th and 11th. He would like to see a larger measure of coöperation between the medical profession and the Home Office than existed to-day.

THE UNDER-SECRETARY'S REPLY

Mr. GEOFFREY LLOYD replying to the debate, said that if allowance was made for the increased number of people at work the industrial accident-rate was a little lower: in 1934 it was 2665 per 100,000 persons employed, and in 1935 it was 2604. Many of the disquieting features in the report this year were the reverse side of the medal of the great industrial revival, which had resulted in more hours being worked and more overtime. Therefore he was sorry to hear Mr. Davies use such terms as "industrial murder." Comparing 1934 and 1924, when practically the same number of people were employed, there was a 20 per cent. reduction in the accident-rate. The Home Office on the industrial side had always engaged actively in trying to reduce industrial accidents, and undoubtedly its Industrial Museum did a great deal of good work which ought to be more widely known. The excess of the rate of juvenile accidents over the adult-rate had been giving concern, and a memorandum had been drawn up for circulation to employers, referring to the need for suitable selection of work on which juveniles were engaged for educating them in the risks attaching to their work and for careful supervision and training during the initial period of employment. The Home Office greatly deplored the excessive hours worked, particularly by women and young persons; but he would point out that they seldom exceeded 47 or 48 per week. It was proposed to deal with the matter of hours in the new Factory Bill next Session, and there would be a very substantial reduction on the present legal limit.

As to workmen's compensation, Mr. Lloyd said that the workman got his compensation in any case whether the expenses, legal, medical, or other were high or low. He could not give Mr. Tinker an answer on the detailed point about examinations by employer's doctors, but he would look into it, and he quite appreciated the feelings entertained in regard to one man being the arbiter in these matters. He also appreciated the position of a man who had to declare to a new employer whether or not he had had an industrial disease. These matters were being considered.

As to silicosis, terrible as it was, some progress was being made. They ought not to be too depressed by the figures at the moment, because they were probably due in a large degree to conditions which no longer existed. Medical examination of new entrants, and periodical medical examination of workers employed in the more dangerous occupations, were required under the Order, and these revealed where conditions were still giving rise to the disease and enabled precautions to be taken. Experiments were also being made by some manufacturers to see whether the use of flint, which was one of the chief causes of silicosis, could not be eliminated. But although there was a good deal of technical progress in the use of alumina, unfortunately things were being held up because the doctors were not yet convinced that alumina was not itself productive of serious disease.

The Bill was read the third time and passed.

NOTES ON CURRENT TOPICS

Summer Adjournment

Both Houses of Parliament adjourned for the Summer Recess on Friday, July 31st, until Thursday, Oct. 29th. In the House of Lords the Royal Assent was given by Commission to more than 70 Acts, including the Consolidated Fund (Appropriation), Education, Housing, Midwives, Public Health, Public Health (London), Shops (Sunday Trading Restriction), Education (Scotland), and Health Resorts and Watering Places Acts.

The Notification of Measles

The House of Commons, on July 27th, considered the Public Health Bill in Committee. Mr. SHAKESPEARE, Parliamentary Secretary to the Ministry of Health, formally moved the omission of "measles" from the list of notifiable diseases.—Sir FRANCIS FREMANTLE said there was a great deal to be said for making measles notifiable but, having inquired generally in regard to its practical application, he found that on the whole it was better to leave the position as it was, where the disease might be made notifiable with certain restrictions as occasion required. He approved the elimination of the amendment which he originally moved in the Joint Select Committee.—Mr. CROOM-JOHNSON said that notification of measles might direct the attention of a great number of people to the necessity for making an extended inquiry into the causes and results of the disease. He hoped that the matter would be looked into again at an early date and that there would be an opportunity of seeing whether something could be done to stir up public opinion on the subject of measles. The amendment to delete "measles" was agreed to.

Mr. SHAKESPEARE moved to postpone the date of the coming into operation of the Bill from April 1st, 1937, to Oct. 1st, 1937. He said that the object of the postponement was to give local authorities more time to frame by-laws. The amendment was agreed to and the Bill passed through Committee.

Milk in Schools

In the House of Commons on July 28th, the vote for the salaries and expenses of the Department of Agriculture in Scotland was considered on Report. In the course of his speech Lieut.-Colonel COLVILLE, Under-Secretary of State for Scotland, said there had been some decline in the consumption of milk in schools during the winter months, no doubt due in part at least to the fact that cold milk was not so popular a drink during winter; but with the return of milder weather there was a considerable improvement in the spring, although the number of children participating in the scheme was well below last year's figure. Under the Scottish Board's scheme during May the average number of children supplied per day was 312,000, as compared with 413,000 in the corresponding month of 1935. Of the total quantity of milk supplied during May over 93 per cent. was Grade A (T.T.). Apart from the effect of weather conditions various reasons had been given for the reduction in the demand for milk in the schools—such as that the novelty had worn off, distaste for milk, lack of enthusiasm on the part of the parents, and the opinion among senior pupils that milk was fattening. Active propaganda was undertaken by the Board in coöperation with educational bodies with a view to stimulating the demand. There were practical difficulties in arranging for the assembling of children at the schools to drink milk on non-school days. An interesting experimental scheme was, however, being carried out in Glasgow where the Board had established four children's milk centres

for the sale of Grade A (T.T.) milk at reduced prices for consumption on the premises by children between the ages of 2 and 15 years. Very satisfactory results had been obtained during the first two weeks, working of the scheme, an average of about 8000 children per day having been supplied with milk.

Sir A. SINCLAIR quoted Prof. Pattison as saying that if the average consumption per head of milk in Scotland was raised by a quarter of a pint, Scotland would require another 100,000 cows and 10,000 more workers to look after them. Even if that happened, the consumption of milk in Scotland would be only about half the consumption per head in Sweden. If the level of milk consumption in Scotland were raised to that of Sweden it was doubtful if there would be enough land in Scotland to carry the number of cows required.

QUESTION TIME

WEDNESDAY, JULY 29TH

Venereal Disease

Sir ARNOLD WILSON asked the Minister of Health whether, in view of the small reduction in fresh cases of venereal disease in the past ten years, he proposed to give effect to the recommendation of the Trevethin Committee in 1923 that the law should be altered so as to permit properly qualified chemists to sell ad hoc disinfectants in a form approved and with instructions for use approved by some competent authority.—Sir KINGSLEY WOOD replied: I am advised that all the available evidence tends to show that the reduction in the incidence of venereal disease in recent years has been considerable. The returns from the Treatment Centres for the year 1935 show a reduction of 34 per cent. in cases of recent infection with syphilis, as compared with the year 1931. The recommendation referred to by my hon. friend was carefully considered after the Trevethin Committee had reported, but the conclusion reached was that it would not be practicable to frame any satisfactory legislation to give effect to that recommendation. I see no reason to dissent from that conclusion.

Supply of Cheap Milk in Special Areas

Mr. DREWE asked the Minister of Agriculture if he was in a position to make a further statement with regard to experimental schemes for the provision of cheap milk to nursing and expectant mothers and children under 5 years of age in the special areas.—Mr. ELLIOT replied: I am glad to announce that the Milk Marketing Board, with the coöperation of the Commissioner for the Special Areas, England and Wales, the Rhondda urban district council and the local distributors have this week instituted an experimental scheme for the supply of milk to nursing and expectant mothers and to children under school age in the Rhondda Valley at the reduced price of 2*d*. a pint.

In giving details the Minister stated that the minimum quantity per head to be supplied is one pint per day, but a greater quantity can be supplied to individuals on the certificate of the medical officer of health, who supervises the whole scheme. The milk is delivered to the consumer.

THURSDAY, JULY 30TH

Conditions of Appointment of Certifying Surgeons

Mr. TINKER asked the Home Secretary if he would consider, when appointing certifying surgeons, ensuring that they should not hold positions or act as medical advisers to owners of works or employers whose employees came before them to be certified.—Sir JOHN SIMON replied: The Departmental Committee on Workmen's Compensation is reviewing the general question of the position and functions of Certifying Factory Surgeons under the Workmen's Compensation Act, and I should prefer to await their report before laying down any rigid rule. If, however, the hon. Member wishes to make representations in regard to any individual cases, I shall of course be prepared to go into them at once if he will be good enough to send me particulars.

Overwork of Young Persons in Industry

Mr. FOOT asked the Home Secretary if his attention had been called to the statement in his annual report of his Majesty's chief inspector of factories that gross cases of overwork of young persons continued; and what action he proposed to take.—Mr. GEOFFREY LLOYD, Under-Secretary, Home Office, replied: Cases of the kind referred to by the chief inspector appear fortunately to be quite exceptional, and my right hon. friend does not see how any action taken by his department can prevent them altogether, but legal proceedings are taken in such cases wherever possible, and this should act as a strong deterrent.

Ophthalmia Neonatorum

Mr. W. ROBERTS asked the Minister of Health whether he was aware that regulations provided that, in cases of ophthalmia neonatorum, notification of this disease had to be made to the district council as the local sanitary authority, whereas the county council, where it was a child-welfare and maternity authority, was responsible for treatment; and, in view of the fact that delay in treatment might cause blindness for life, whether he would revise the regulations so as to provide that notification should be made in such cases by telegram or telephone direct to the county medical officer of health, concurrently with notice to the district council.—Sir KINGSLEY WOOD replied: Under the regulations in force, a medical practitioner in attendance upon a child suffering from this disease is required to notify the case forthwith to the medical officer of health of the local sanitary authority, and that officer is required to forward a copy of such notification to the county medical officer of health within 24 hours of its receipt. A system of dual notification appears to me to present certain disadvantages, and as at present advised I see no sufficient reason for amending the regulations in the manner suggested. The importance of making definite arrangements for securing the prompt treatment of this disease has been emphasised in circular letters issued to local authorities by my department, and I will send copies to the hon. Member.

Mr. ROBERTS: Does not the right hon. gentleman think that in country districts to have the local sanitary authority forwarding the notification may delay investigation very seriously?

Sir KINGSLEY WOOD: I shall look into that point. I regard this matter as important, and if the right hon. gentleman has any information to give me upon it I shall be glad to examine it.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

PADDINGTON MEDICAL SOCIETY.
TUESDAY, August 11th.—9 P.M. (Great Western Royal Hotel, Paddington), Clinical Discussions.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
MONDAY, August 10th.—2.15 P.M., Dr. Duncan White: Radiological Demonstration.
THURSDAY.—2 P.M., Operative Obstetrics.
FRIDAY.—2.15 P.M., Department of Gynæcology: Pathological Demonstration.
Daily 10 A.M. to 4 P.M., Medical Clinics. Surgical Clinics or Operations. Obstetrical and Gynæcological Clinics or Operations.

PROFESSIONAL CLASSES AID COUNCIL.—In 1921 this council was reconstructed as a permanent association for the relief of distress among professional people. Financial assistance is most often given in the form of help with education and the training of young people or with the expenses of illness. In the Council's 15th annual report it is stated that last year 370 families were helped—30 more than the previous year—while a further 280 families were advised of appropriate sources of help. There was a deficit of over £600 on last year's work and further subscriptions and donations are badly needed. The address of the Council is 250, Brompton-road, S.W.3.

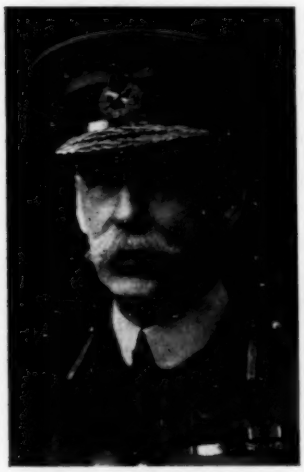
OBITUARY

SIR ALFRED KEOGH, G.C.B., G.C.V.O., M.D. R.U.I., F.R.C.P. Lond.

LATE DIRECTOR-GENERAL, A.M.S.

Sir Alfred Keogh, twice director-general of the Army Medical Services, died on July 30th in London. His name will ever be remembered as a famous administrator. He was appointed director-general of the Army Medical Services shortly after the conclusion of the South African war, to be called nine years later to the same responsible position during the European war. His first appointment was a recognition of the way in which he had discharged important duties during a long and vexatious struggle; and his second appointment resulted from the wise presumption of the War Office that the way in which medical duties were discharged in the enormous difficulties ahead would be of the first importance to the country and our allies, and the conclusion that Keogh was eminently fitted for the position of responsible head.

Alfred Keogh was the son of an Irish barrister and resident magistrate, Henry Keogh of Roscommon. He was born in 1857 and received his medical training at Queen's College, Galway, where he graduated M.D., M.Ch. R.U.I. in 1878, having been a prizeman as a student. After a period at Guy's Hospital he became house physician at the Brompton Hospital, while he was also for a time clinical assistant at the Royal Westminster Ophthalmic Hospital. In 1880 he joined the R.A.M.C. and at the medical school at Netley was Herbert prizeman and Martin memorial gold medallist. He was appointed surgeon to the Royal Arsenal at Woolwich, and was quickly promoted surgeon major, the rank which he held at the outbreak of the South African war.



SIR ALFRED KEOGH

[Photograph by Russell

Keogh served throughout the South African war with great distinction, was mentioned in dispatches, specially promoted lieut.-colonel, received the Queen's medal with four clasps, and was created C.B. From 1902–04 he was deputy director-general, A.M.S., and in 1905 he became director-general, a post which he held for five years. He was responsible for valuable alterations in the organisation of the department during his first directorate. He had the advantage, not always enjoyed by the distinguished officer at the head of the A.M.S., that he was possessed of considerable medical and clinical knowledge before he joined the army. He showed himself prompt to see that wherever connexions could be established between the civilian and military doctor the advantage to the country and the Army would be great and direct. Undoubtedly it was this wide range of knowledge which enabled Keogh during his first tenure of office to bring about valuable reforms. His experience of actual war led him during his first term as D.G.M.S. to visualise how civilian medicine could best be made to coöperate with the R.A.M.C. in times of peace, but especially in times of emergency or war. Hence the provision of Territorial hospitals in connexion with the medical schools of the principal centres of medical education. Civilian physicians and surgeons, members of the staffs of the great hospitals, were enrolled in the scheme and given Territorial rank, with the result that an organised alliance between civilian and military medicine was in existence when the first period of the European war brought back thousands of wounded, evacuated from France at the opening stages. Always keeping himself abreast of scientific progress he was able to make suggestions for reform that were in line with those occurring in civilian medicine and in the sanitary service of the country. The medical department during the South African war was gravely criticised, but the nature of the difficulties which it had to meet was not realised by the public. Keogh's personal experience led him to see both how the department could be improved by the offer of better opportunities of scientific work to the officers and by the collaboration of the department with civilian medicine and with scientific developments in all directions. This general acquaintance with the part which developing science must play in the relations of medicine to war was strengthened by his appointment in 1910 as rector of the Imperial College of Science and Technology. Hence upon his record and his great acquirements his appointment shortly after the outbreak of the European war as director-general in association with Sir Arthur Sloggett was recognised as a thoroughly wise move. While Sir Arthur Sloggett was abroad with the British Forces Keogh, in England, undertook the heavy duty of supplying the armies with an adequate medical service and of supervising general conduct of the department. Keogh had looked forward with wonderful prevision. The Territorial hospitals formed a pattern for the military hospitals which, as the war went on and the number of the evacuated casualties became vast, were ready for the reception of the wounded. Keogh gathered round him a representative committee of consultants and on their advice was able to deal systematically and scientifically with the situation. The need for special war hospitals was soon perceived and the staffs here were organised from civilian doctors without Territorial rank, but belonging fully to the great body of army doctors. The plight of the wounded soldier had never been so cared for, while Keogh's personality pervaded the whole of the huge activities.

How and why Keogh succeeded so well is indicated in the following communication from Sir Percy Blenkinsop who served with distinction under him. Sir Percy writes:—

"Those of us who had the privilege of working under Sir Alfred Keogh in the War Office during the Great War will always remember him with admiration and affection. He knew exactly how far he could delegate responsibility and, if one was fortunate enough to gain his confidence, one could rely upon him for support through thick and thin. He did not worry much about details, but kept a firm hold on everything of importance, and his clear vision and quick decision enabled him to carry through the immense amount of work which the rapid expansion

of the medical services involved. He was in close touch with the leaders of the medical profession and the leading scientists and relied upon them for advice when any technical subject cropped up in which their special knowledge would be of use. Though a man of strong views, he was always willing to discuss any decision which he was about to make, and was quite prepared to alter it if he could be convinced that an alteration would be better policy. He appeared to see by intuition what lesser men could appreciate only after long and anxious thought. He was a marvellous judge of men and knew exactly how to use their qualifications and limitations when making appointments. If they failed, and few of them did, they were at once relegated to positions of less importance. His relations with the heads of other branches of the War Office were most cordial, and his advice was often asked on subjects other than those in which his own department was specially concerned. He was a quick worker and had a mind of great adaptability which enabled him to turn from one subject to another without a pause. His tact, patience, and courtesy in dealing with the endless chain of interviewers and deputations which crowded round his office were astounding; and, though it was impossible to please all of them, they went away satisfied that they had had a fair hearing. Busy as he was, he always seemed to have time for an enormous amount of correspondence, and I still have long letters in his own handwriting which he sent to me when I was in Mesopotamia. When he became director-general for the second time he had the gratification of seeing how well the organisation of the medical services, for which he was almost entirely responsible, bore the strain of the greatest war in history. The R.A.M.C. College is only one memorial of its founder, Sir Alfred Keogh. His great services to his country and to the corps he loved so well can never be forgotten."

When Sir Alfred Keogh, at the conclusion of hostilities, resumed his duties at the Imperial College of Science and Technology only one feeling went forth from his colleagues, military and civilian, and from all those officially concerned in the conduct of the war—indeed from every citizen in the Empire. The country was proud of what he had done and full of admiration for the way in which he had done it. There is no doubt that at the beginning of the war there was a feeling in the medical profession, which found reflection and even exaggeration in the public mind, that medical knowledge was not being utilised by the country with full intelligence and economy. This may have been so in the past, but in the case of the European war the enormous difficulties of the medical department were met with promptitude under Keogh's administration. To recall the situation is to justify these words. When the war broke out the establishment of medical military officers was under 2000. Within a few weeks operations under conduct called for three times this number of medical officers, and from that date forward the whole story is one of increasing the army and therefore the number of its medical officers. The demand upon the civilian medical profession became so heavy that there was anxiety lest the draft of the medical men with the army should become a source of danger at home. But a Central Medical War Committee being instituted, its assistance received cordial acceptance from Keogh and his staff, when the anticipatory scheme of ten years before proved capable of meeting the strain. What tragedies were averted none can estimate, and Keogh's right to the title of a great man cannot be gainsaid.

Such a record of service was naturally marked by the reception of many titles and distinctions. Keogh, who had been made C.B. during the South African war, was promoted K.C.B. in 1906; during the European war he was appointed G.C.B. and G.C.V.O., being already honorary physician to King George V. In 1918 he became C.H. The universities of Oxford, Edinburgh, Aberdeen, and Dublin awarded him an honorary degree; he was an honorary fellow both of the English and Irish College of Surgeons. He was a grand officer of the Legion of Honour and of the Crown of Belgium, and held a high Serbian decoration. Needless to say this list is not exhaustive.

Sir Alfred Keogh married first, Elizabeth, daughter of Dr. St. George Williams, I.M.S., who died in 1887, and secondly, Camilla, daughter of Captain W. Hamilton Hart, and leaves a son by the first and two daughters by the second marriage.

MEDICAL NEWS

University of Cambridge

Applications for the Elmore medical research studentships which were described in our issue of June 27th (p. 1482) should reach the regius professor of physic, department of medicine, not later than August 10th.—A John Lucas Walker studentship is soon to be awarded and applications should reach Prof. H. R. Dean at the department of pathology, not later than Sept. 30th. Further information about it may be had from him.

On July 31st the following degrees were conferred:—

M.D.—B. C. Nicholson and L. P. J. Evans.

M.B., B.Chir.—F. R. R. Martin, H. S. Davis, C. N. Gosse, D. J. Watterson, and N. P. Brown.

M.B.—R. M. Jones, J. B. Tracey, H. S. Buckland, C. U. Gregson, J. F. Paterson, W. T. Cooke, and T. M. Daniel.

B.Chir.—B. S. C. Gaster, F. C. Maddox, A. L. Jackson, and A. D. Hodges (by proxy); and J. A. Falk, C. M. Heath, D. R. Seaton, R. C. Droop, J. C. Newbold, J. W. Parks, John Diver, J. W. Landells, T. J. Morton, J. F. L. Walley, A. M. Weston, A. C. Fraser, C. J. F. Coombs, H. P. R. Smith, R. G. Bickford, J. E. A. David, Rupert Solley, M. H. Harding, R. H. A. Swain, J. R. C. Williams, and John Mackellar.

Royal College of Physicians of London

At the quarterly meeting of the College on July 30th with Lord Dawson, the president, in the chair, the following were elected officers for the ensuing year:—

Censors: Lord Horder, Dr. C. E. Lakin, Sir Maurice Cassidy, and Dr. Albert Ramsbottom. Treasurer: Dr. Sidney Phillips. Registrar: Sir Raymond Crawfurd. Harveian Librarian: Dr. Arnold Chaplin. Assistant Registrar: Dr. Charles Newman. Library Committee: Dr. H. R. Spencer, Dr. J. J. Conybeare, Dr. Adolphe Abrahams, and Dr. Reginald Hilton. Curators of the Museum: Dr. G. E. Beaumont, Dr. R. A. Hickling, Dr. D. T. Davies, and Dr. E. C. Warner. Finance Committee: Dr. C. R. Box, Prof. F. S. Langmead, and Dr. Anthony Feiling.

The following were elected examiners:—

Chemistry: Mr. J. E. Facer and Mr. C. S. Gibson. Physics: Mr. J. H. Brinkworth and Mr. Gilbert Stead. Materia Medica and Pharmacology: Dr. Philip Hamill, Dr. R. St. A. Heathcote, Dr. Clifford Hoyle, Prof. E. J. Wayne, and Prof. W. J. Dilling. Physiology: Prof. C. A. Lovatt Evans, F.R.S., and Prof. D. T. Harris. Anatomy: Dr. Thomas Yeates. Pathology: Dr. Charles M. Wilson, Dr. Terence East, Prof. Geoffrey Hadfield, and Dr. P. N. Panton. Medical Anatomy and Principles and Practice of Medicine: Dr. C. M. Hinds Howell, Dr. A. G. Gibson, Dr. H. C. Cameron, Dr. Gordon Holmes, F.R.S., Prof. Albert Ernest Naish, Dr. Anthony Feiling, Dr. G. E. S. Ward, Prof. W. H. Wynn, Dr. R. A. Rowlands, Dr. J. A. Drake, Dr. J. Forest Smith, and Dr. T. Jenner Hoskin. Midwifery and Diseases peculiar to Women: Prof. Gilbert Strachan, Mr. J. M. Wyatt, Mr. A. J. McNair, Mr. Leslie Williams, and Prof. R. P. Ranken Lyle. Public Health: Part I., Prof. M. E. Delafield; Part II., Dr. C. T. Maitland. Tropical Medicine: Prof. J. Gordon Thomson and Lieut.-Colonel G. S. Parkinson. Ophthalmic Medicine and Surgery: Dr. F. M. R. Walshe. Psychological Medicine: Part I., Dr. Henry Yellowlees; Part II., Dr. Douglas McAlpine and Dr. G. W. B. James. Laryngology and Otology: Mr. V. E. Negus. Radiology: Prof. Sidney Russ and Dr. Russell J. Reynolds. Anæsthetics: Dr. C. W. Morris. Child Health: Dr. Leonard Parsons.

The Weber-Parkes medal and prize was awarded to Sir St. Clair Thomson for his valuable work on tuberculosis of the larynx, and the Moxon gold medal to

Dr. Edward Mellanby, F.R.S., for his distinguished work on the problems of nutrition. The Harveian oration on Oct. 19th will be delivered by Sir Walter Langdon-Brown. Dr. Arthur Hurst was appointed Harveian orator and Dr. E. A. Cockayne Bradshaw lecturer for 1937. Dr. J. W. McNee was re-elected a representative of the College on the executive committee of the Imperial Cancer Research Fund.

The following candidates, having satisfied the Censor's Board, were elected to the membership of the College :—

H. W. Allen, M.D. Oxon.; E. C. Allibone, M.B. Leeds; J. C. Batt, M.D. Brist.; J. F. Bradbury, M.B. N.Z.; Margaret Cleland, M.B. Adelaide; W. T. Cooke, B.Chir. Camb.; P. T. Cooper, M.B. Camb.; Berly D. Corner, M.B. Lond.; A. A. Cunningham, M.D. Dubl.; J. V. Dacie, M.B. Lond.; H. S. Davis, L.R.C.P. Lond.; George Davison, M.D. Durh.; Anastasio D'Souza, M.B. Lond.; C. J. Gavey, M.B. Lond.; L. E. Glynn, M.B. Lond.; W. H. P. Hill, M.D. McGill; J. P. Horan, M.D. Melb.; M. H. K. Kane, M.B. Lond.; G. C. Moss, M.B. Melb.; E. H. T. Nash, L.R.C.P. Lond.; N. R. Pooler, M.B. Lond.; N. L. Price, M.D. Brist.; B. K. R. R. K. Rao, M.B. Mysore; A. A. Rogow, M.D. Toronto; Jack Sakula, M.B. Lond.; M. A. Soliman, M.D. Cairo; D. J. Thomas, M.D. Melb.; R. W. D. Turner, M.B. Camb.; and H. E. Whittingham, Air Commodore, R.A.F., M.B. Glasg.

Licences to practise were granted to the candidates named in the report of the Royal College of Surgeons and to F. C. Collingwood, S. G. Griffin, W. L. Isaac, S. A. Jenkins, A. H. Masina, and G. Williams. Diplomas were also conferred jointly with the Royal College of Surgeons on the candidates named in its report.

Royal College of Surgeons of England

An ordinary meeting of the council of the College was held on July 30th, with Sir Cuthbert Wallace, the president, in the chair. Mr. T. Stewart Heslop, of Manchester University, was appointed a Leverhulme scholar for one year, for a research on the autonomic nerve-supply of the stomach in relation to peptic ulceration. A diploma of fellowship was granted to E. J. Grieve, of Melbourne University and St. Bartholomew's Hospital. Diplomas of membership were granted to the following candidates, who have passed the final examination of the Conjoint Board.

R. B. Abdel-Messih, St. George's; C. A. P. Achyutan Pillai, Madras and Edin.; G. P. Arden, Univ. Coll.; F. J. S. Baker, St. Bart.'s; *Beryl E. Barsby, Roy. Free; Louis Bass, Middlesex; W.-F. E. Baumann, Cape and Edin.; F. G. A. Beckett, Camb. and St. Bart.'s; S. J. Bellgard, Calcutta and St. Mary's; B. B. Bhatia, Lucknow and London; B. J. Bickford, St. Bart.'s; F. A. Bleaden, Guy's; K. E. Bond, Camb. and St. Thomas's; G. C. Brentnall, St. Bart.'s; J. C. Brundret, Manch.; J. T. H. Butt, Camb. and St. Bart.'s; *Phyllis M. Button, Roy. Free; P. C. Calvert, Westminster; R. S. Castle, Camb. and St. Thomas's; Richard Chignell, London; W. A. Cobb, St. Bart.'s; J. A. Cochrane, Brist.; J. W. C. Cochrane, St. Bart.'s; D. H. Coe, King's Coll.; P. N. Coleman, Birm.; *Florence I. Collier, Roy. Free; K. E. Cooper, Leeds; *Gwendolen K. G. Coote, Univ. Coll.; W. W. Coppinger, Oxf. and Middlesex; *Barbara G. Courtney, Roy. Free and West London; A. J. F. Crossley, Manch.; H. O. Crwys-Williams, Cardiff; *Enid Cyriax, Birm.; L. F. Dale, St. Bart.'s; *Hilla Damry, Roy. Free; D. A. Davies, London; John Devlin and P. R. Dias, King's Coll.; E. N. Dowell, St. Mary's; C. H. Drake, London; C. M. Dransfield and J. J. Dubash, St. Bart.'s; H. L. Ellis, Camb. and Middlesex; John Evans, Camb. and St. Mary's; *Margaret A. B. Fleming, Roy. Free; W. A. J. Fox, Westminster; D. B. Fraser, Oxf. and St. Bart.'s; K. D. Fraser, Univ. Coll.; Edward Geal and A. C. Gee, Westminster; A. T. George, Madras and West London; A. J. Gill, Liverp.; Adalberto Gómez, St. Bart.'s; Arnold Gourevitch, Birm.; I. C. A. D. P. Graham, Camb. and St. Thomas's; C. H. Gray and C. W. E. B. Greaves, Univ. Coll.; Khaja Hamiduddin, Bombay and St. Bart.'s; Johannes Hanekom, Cape Town; M. H. Harding, Camb. and London; J. W. K. Harper, Univ. Coll.; F. E. S. Hatfield, St. Mary's; W. H. Hayes, Brist.; C. F. L. Hill, St. Mary's; Selwyn Hills, Camb. and Middlesex; F. G. Hollands, St. Bart.'s; L. J. Honeywill and J. S. Horn, Univ. Coll.; R. A. Hughes, Liverp.; John Hynes, Middlesex; Stuart Jackson, Guy's; G. C. W. James, St. Thomas's; S. F. Jayawardene, Ceylon and King's Coll.; *Ursula J. Jeffery and *Gladys I. Jeffree, King's Coll.; S. A. Jenkins, Cardiff; E. H. Jones, Guy's; M. A. Jones, Cardiff; L. N. Kaplan, Cape and Guy's; A. I. Kinnear, St. Bart.'s; J. D. Kinnear and B. W. Lacey, Middlesex; *Marjorie F. Landau, Roy. Free; D. J. Lapping, St. Thomas's; J. I. H. Laurie, Camb. and St. Thomas's; A. D. Ledward, Camb. and St. Bart.'s; Jacob Lefcovitch, Middlesex; V. N. Leyshon, Charing Cross; *Mary M. M. Llewellyn, Cardiff; V. D. Logue, St. George's; *Dorothy K. Lopez, Delhi and West London; H. R. Loughran, Camb. and Guy's; José Lurie, London; R. I. Macbeth, King's Coll.; John Mackellar, Camb. and St. Mary's; F. R. Malan, W'rand. and Guy's; J. A. Manifold, St. Thomas's; M. A. Margo, W'rand. and London; Morris Markowe, Charing Cross; *Mary D. Mellersh, Roy. Free; J. F. Meynell, Manch.; W. A. M. Miller, Camb. and St. Thomas's; N. H. M. R. Monro, Edin. and Brighton; S. P. Morrison, Cape and London; T. J. Morton, Camb. and Charing Cross; T. P. Myles, Camb. and St. Mary's; A. G. Nambiar, Madras and London; Elia Nashid, Cairo and St. George's; J. C. Newbold, Camb. and St. Bart.'s; C. S. Nicol, Edin. and St. Mary's; Ananda Nimalasuria, Ceylon and King's Coll.; David Norton, Cape and Univ. Coll.; M. J. O'Donnell, Charing Cross; M. G. O'Flynn, St. Mary's; W. E. Owens, Camb. and St. George's; S. H. Pearse, St. Thomas's; *Peggy C. Permain, Roy. Free; *Nancy Perry, Univ. Coll.; Robert Petticrew, Leeds; W. M. Philip, Guy's; H. M. Pickard, Charing Cross; Geoffrey Platt, Liverp.; Nallarakuppillai Ponnampalam, Univ. Coll.; *Mary Rabinowitz, Dub.; *Shila G. Ransom, Roy. Free and West London; B. N. B. Rao, Bombay and West London; J. A. Ritchie, King's Coll.; D. W. Rossiter, Middlesex; B. M. D. Rosten, St. Bart.'s; Amarnath Sah, Lucknow and Edin.; Eric Samuel, Middlesex; D. A. Sanford, Univ. Coll.; I. C. Sarwal, Bombay and St. Bart.'s; J. S. H. Scott, St. Mary's; W. P. Shemilt, St. Bart.'s; G. L. Simmons, Oxf. and St. Thomas's; Ranajit Sinha, Calcutta and West London; Abraham Skolar, Middlesex; J. M. Smiles, Univ. Coll.; F. W. Smith, Manch.; E. H. J. Smyth, St. Bart.'s; J. B. Spearman, Guy's; W. H. Stephenson, St. Thomas's; R. S. Stevens, Camb. and St. Thomas's; G. T. Stockings, King's Coll.; William Stoddart, St. Bart.'s; R. N. Tattersall, Leeds; W. J. J. Taylor, Camb. and St. Bart.'s; D. T. Thomas, Cardiff and London; G. F. J. Thomas, Cardiff; C. S. Van Heerden, Cape and London; R. N. E. Watt and J. C. Watts, St. Thomas's; *Una M. Westell and *Ailsa M. L. Whitehouse, Birm.; B. D. Whitworth, Camb. and St. George's; D. J. Wilkes, Birm.; Robert Williamson, Camb. and St. George's; W. H. Wolstenholme, Manch.; S. R. Wood, Birm.; *Eluned Woodford-Williams, Univ. Coll.; P. M. Wright, St. Bart.'s; H. R. Wynne, Camb. and St. Thomas's; D. E. Yarrow, Camb. and London; Muhammad Yasin, St. Thomas's; A. L. Young, London; M. D. Young, Camb. and London; *Ruth E. Young, Univ. Coll.; and Z. E. Zuckerman, Cape and Guy's.

Diplomas in special subjects were granted, jointly with the Royal College of Physicians, as follows :—

D.T.M. & H.—G. T. Balean, C. H. Bannerman, A. V. Bernard, W. T. C. Berry, A. M. El-Nakah, Mohammed Faimuddin, H. P. Fernandes, Wilhelm Horovitz, J. F. Jarvis, *Eileen M. King, C. A. McComiskey, J. L. McLetchie, M. L. Nairac, W. R. Phillipps, J. W. Pickles, Susilananda Sen, P. C. B. Shirreffs, H. E. Shortt, B. L. Somway, Tsung-Sing Sze, I. S. Varma, and H. D. Weatherhead.

* Women candidates.

D.O.M.S.—Henry Berney, R. J. Buxton, C. J. Cantillon, Charles Cockburn, Ernest Edwards, P. B. English, E. D. G. Galton, Hans Goldschmidt, H. E. Hargreaves, Ahmed Kamel, A. L. Lance, J. S. MacLean, J. A. Magnus, B. R. Medlycott, E. D. E. E. O'Brien, G. B. Orbell, William Russell, H. H. Skeoch, J. K. S. Smith, E. J. Somerset, L. P. Spero, J. P. J. Taunk, J. H. Young, and J. E. Zeitlin.

D.M.R.—A. K. M. Khan, K. P. Mody, J. R. Nuttall, William Tennent, J. A. Vote, and D. A. Wilson.

D.A.—M. N. Desai, H. C. Disher, Henry Johnson, Mohamed Selim, Jack Smith, H. N. Webber, and H. B. Wilson.

Society of Apothecaries of London

At recent examinations the following candidates were successful :—

Surgery.—D. S. G. Genge, St. Thomas's; W. A. Royds, Manch.; and O. H. Saldanha, Bombay.

Medicine.—S. M. Basu, Durh.; G. E. N. Bird, St. Bart.'s; J. W. Cazalet, Bombay and West London; J. A. G. Gulliford, Welsh National School of Medicine; R. P. Huggins, Westminster and West London; R. A. McMillan, Middlesex; and N. Mukherjee, Durh.

Forensic Medicine.—G. E. N. Bird, St. Bart.'s; J. W. Cazalet, Bombay and West London; G. K. Coombes, King's Coll.; J. A. G. Gulliford, Welsh National School of Medicine; R. A. McMillan, Middlesex; and N. Mukherjee, Durh.

Midwifery.—A. Bagon, Manch.; R. F. B. Bennett, Oxf. and St. George's; P. H. Denton, Guy's; P. A. Dixon, Liverp.; M. M. El-Badri, Durh.; P. A. Gardiner and H. D. Lamb, Guy's; C. W. Mills, St. Bart.'s; A. W. B. Perren, Sheff.; R. Robins-Browne, London; W. A. Royds, Manch.; O. H. Saldanha, Bombay; J. K. Sargentson, Camb. and St. Mary's; and E. G. F. Skinner, Sheff.

The following candidates, having completed the Final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery :—

S. M. Basu, R. P. Huggins, N. Mukherjee, and J. K. Sargentson.

University of London

After August 21st the official address of the University will be "University of London, W.C.1." (Telegrams: University London. Telephone number: Museum 8000.) The main entrance for the present will be in Montague-place, opposite the north gate of the British Museum. The library will not be transferred to Bloomsbury until the New Year, and it should still be addressed at South Kensington, S.W.7. Most university examinations are also being held at South Kensington, but candidates and examiners will be informed of the place of examination.

The following have been recognised as teachers of the University in respect of the posts indicated: Dr. H. K. Graham Hodgson, teacher of radiology at the Middlesex Hospital medical school; Mr. A. C. R. McLeod, teacher

of dental surgery at University College Hospital medical school; Dr. Hugh Davies, teacher of radiology at King's College Hospital medical school; and Mr. H. L. C. Wood, teacher of surgery at King's College Hospital medical school.

Applications are invited for the William Julius Mickle fellowship, which is of the value of at least £200 and is awarded annually by the senate to the graduate of the University resident in London who has done most to advance medical art or science within the preceding five years. Applications should reach the principal of the University by Oct. 1st, and further information may be had from the academic registrar.

Scottish Conjoint Board

At recent examinations of the Royal Colleges of Physicians and Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow, the following candidates were successful:—

B. G. Kelly, W. C. Botha, Arpad Sachs, I. A. Badawi, Alfred Loeser, Samuel Grubin, Leon Stern, Jack Chernus, Erich Wittkower, Kate Misch, Benjamin Kirschner, Jacob Weinstein, N. H. Solomon, H. W. Kosterlitz, Babette Herz, B. S. Oxman, G. B. Drummond, L. H. Mirsky, Alastair Keay, G. M. Warrack, L. M. Shirlaw, David McLean, C. R. Hamand, T. M. Dolan, W. A. Christie, Herman Hirschson, J. W. Magill, John Lanny, H. G. Grieve, W. L. McNamara, and J. H. Kuhn.

Sir Ernest Graham-Little, M.P., has been elected a member of the French Dermatological Society.

THE death is announced on August 4th at Loughton of Dr. Arthur Butler Harris, Lt.-Col. R.A.M.C. (T.F.), retired. For a short time he was M.O.H. of Stoke Newington and since 1901 of Loughton U.D.C. During the war he was special sanitary officer of the Woolwich District, and he was a D.L. for the county of Essex.

Worcester Royal Infirmary

This hospital has an overdraft of over £12,000 and the nurses' home must be extended because more beds are needed.

Scarborough's New Hospital

The new Scarborough hospital, which has been constructed at a cost of £120,000, will be opened by the Duke of Kent on Oct. 23rd.

Memorial to King George at Warrington

An appeal for £8000 is to be made to provide money for a health centre at Warrington and to endow a cot in the Warrington Infirmary as a memorial to King George. The centre will include a lecture room, an artificial sunlight room, a nursery, and a dispensary.

Post-graduate Course in Paris

A post-graduate course on surgical technique in relation to the motor system (bones, joints, &c.) will be held in Paris in the medical school of the University from Oct. 12th to 28th. Prof. Ombrédanne and Prof. Paul Mathieu will give demonstrations and will operate. Further information may be had from the secretary of the Faculté de Médecine.

Institute of Child Psychology

Among the courses arranged by this institute for next session is a one-year course for medical men and women which is designed to give post-graduate training in the psychopathology of childhood. Candidates must hold a diploma of psychological medicine, or have completed the two-year course at the Institute of Medical Psychology, or have had adequate experience in children's medicine. Further information may be had from the secretary of the Institute, 26, Warwick-avenue, London, W.9. The course will begin in September.

Vacancies

For further information refer to the advertisement columns

Aberdeen Royal Infirmary.—Asst. M.O. for Radium Dept., £150–£250.
Accrington, Victoria Hospital.—H.S., £150.
Albert Dock Hospital, Connaught-road, E.—Res. M.O., at rate of £110.
Barrow-in-Furness County Borough.—Deputy M.O.H. and Asst. Tuber. O., £550.
Bath, Royal United Hospital.—H.S., at rate of £150.
Benenden, National Sanatorium.—Sen. H.P., at rate of £200.
Birkenhead Municipal Hospital.—Three Res. M.O.'s, each £300.
Birmingham City Mental Hospital.—Jun. Asst. M.O., £350.
Birmingham, Selly Oak Hospital.—Jun. M.O.'s, each at rate of £200.
Bristol University.—Lectureship in Physiology (Grade II.), £400.
Burnley County Borough.—Asst. M.O., £500.
Burton-upon-Trent, County Borough.—Deputy M.O.H., £600. Also Asst. M.O.H., £500.
Canterbury, Kent and Canterbury Hospital.—H.S., at rate of £125.
Cardiff, University College of South Wales and Mon.—Asst. Lecturer and Demonstrator, £400.
Carlisle, Cumberland Infirmary.—Res. Surg. Reg., £250. H.S., at rate of £175. Also Second H.S., H.P., and H.S. to Special Depts., each at rate of £155.
Central London Ophthalmic Hospital, Judd-street, W.C.—Sen. and Jun. H.S., £120 and £100 respectively.
Chester City (Public Assistance) Hospital.—Jun. Res. M.O., £200.
City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—H.P., at rate of £100.
Coventry, Gulson-road Municipal Hospital.—Second Asst. Res. M.O., £250.
Derbyshire Royal Infirmary.—Ophth. H.S. and Emergency Anæsthetist, £150.
Dewsbury and District General Infirmary.—Second H.S., £150.
Doncaster Royal Infirmary and Dispensary.—H.S., £175.
Dorchester, Dorset Mental Hospital.—Deputy Med. Supt., £575.
Durham County Council.—Asst. Welfare M.O. and District Tuber. M.O., each £500.
Edinburgh, Princess Margaret Rose Hospital for Crippled Children, Fairmilehead.—Asst. Surgeon and Res. Surg. O., £200 and £100 respectively.
Gloucestershire Royal Infirmary.—Res. Surg. O., £200.
Great Yarmouth General Hospital.—H.S., £140.
Grimsby and District Hospital.—Jun. H.S., £150.
Guildford, Royal Surrey County Hospital.—H.S., £150.
Herefordshire General Hospital.—H.P., also H.S. and Cas. O., each £100.
Hull Royal Infirmary.—First H.S. and Second Cas. O., each at rate of £150. Also Hon. Surgeon.
Institute of Ray Therapy, 152, Camden-road, N.W.—Part-time Clin. Asst., at rate of £150.
Ipswich, East Suffolk and Ipswich Hospital.—H.S., £144.
Keighley and District Victoria Hospital.—Res. M.O., at rate of £180.
Kettering and District General Hospital.—Second Res. M.O., at rate of £125.
Leamington Spa, Warneford General Hospital.—Cas. O., at rate of £150.
Leicester Royal Infirmary.—Pathologist.
Liverpool City.—Res. Asst. M.O. for Orthopædic Wards, Alder Hey Hospital, £200.
London University.—William Julius Mickle Fellowship, £200.
Maidstone, Kent County Ophthalmic and Aural Hospital.—H.S. to Ear, Nose, and Throat Dept., at rate of £200.
Marie Curie Hospital, 2, Fitzjohn's-avenue, N.W.—Director of Medical Services and Research, £1000. Also Res. M.O., £100.
Metropolitan Hospital, Kingsland-road, E.—Cas. O. and Res. Anæsthetist, £100.
Miller General Hospital, Greenwich-road, S.E.—Cas. O. and H.S., at rate of £150 and £100 respectively.
Newport, Mon., Royal Gwent Hospital.—Cas. O. and H.S., each at rate of £135.
Nottingham Children's Hospital.—Res. H.S., at rate of £150.
Nottingham General Hospital.—Second Cas. O., at rate of £150.
Oldham Royal Infirmary.—Cas. O. and H.S. to Fracture Dept., at rate of £175.
Plymouth, City General Hospital.—Jun. Asst. M.O.'s, at rate of £250.
Portsmouth Royal Hospital.—H.P., at rate of £130.
Princess Louise Kensington Hospital for Children, St. Quintin-avenue, W.—H.S., at rate of £120–£150.
Queen Charlotte's Maternity Hospital, Marylebone-road, N.W.—Res. M.O. for Isolation Hospital, at rate of £200.
Queen Mary's Hospital for the East End, Stratford, E.—Cas. and Out-Patient Officer. Also Res. Anæsthetist and H.P.
Rochdale Infirmary and Dispensary.—Hon. Surgeon to Ear, Nose, and Throat Dept.
Royal College of Physicians, Pall Mall East.—Milroy Lecturer for 1938.
Royal Naval Medical Service.—M.O.'s.
Royal Northern Hospital, Holloway, N.—H.P. and Obstet. H.S., each at rate of £70.
Ruthin Castle, North Wales.—Jun. Res. Physician, £200.
St. Bartholomew's Hospital, E.C.—Dental H.S., at rate of £80.
St. Bartholomew's Hospital Medical College, E.C.—Demonstrator of Experimental Physiology, £300.
St. Helen's County Borough.—Asst. M.O.H., £500.
St. John's Hospital, Lewisham, S.E.—Res. H.P., at rate of £100.
Salvation Army Mothers' Hospital, Lower Clapton-road, E.—Jun. Res. M.O., at rate of £80.
Sheffield Royal Infirmary.—Clin. Asst. to Med. Dept., at rate of £300.
Staffordshire General Infirmary.—H.S., at rate of £200.
Swansea County Borough.—Asst. M.O., £500.
Walsall General Hospital.—H.S., at rate of £150.
Weir Hospital, Grove-road, Balham, S.W.—Jun. Res. M.O., £150.
West End Hospital for Nervous Diseases, Gloucester-gate, N.W.—Res. H.P., £125.
Westminster Hospital, Broad Sanctuary, S.W.—Wander Scholarship in Diseases of Children, £250.
Weston-super-Mare Hospital.—Res. H.S., £150.
Wolverhampton, Royal Hospital.—Res. Asst. Surgeon and Surg. Reg., £250.
Woolwich and District War Memorial Hospital, Shooter's-hill, S.E.—Res. M.O., at rate of £175. Also H.P. and H.S., each at rate of £100.

NOTES, COMMENTS, AND ABSTRACTS

HOSPITAL REFORM

ON July 29th the Socialist Medical Association submitted a memorandum to the Voluntary Hospitals Commission urging early reforms in organisation. The ultimate policy of the Association is that the voluntary hospitals should be absorbed into a complete, unified, and coördinated medical service. But the following steps could, they believe, be taken immediately to secure a better service for the community.

1. *Admission of Emergency and Urgent Cases.*—There should be established without delay in London and in the larger provincial centres, central coördinating offices to facilitate speedy admission of emergency and urgent cases to all hospitals irrespective of whether they are voluntary or municipal. There is in London a highly efficient and excellently organised department of the London County Council which deals with the collection by ambulance and transfer to all general hospitals of street accident cases and to the London County Council hospitals of cases of infectious disease, in addition to 75,000 cases taken annually to L.C.C. general and special hospitals and 10,000 to London voluntary hospitals. This service should without delay be extended in order to provide for the admission of all emergency and urgent cases to all general hospitals in a specified area. In London this work should be undertaken by the L.C.C. which already provides the public ambulance service.

2. *Evening Out-patient Clinics.*—It is essential for the working-class population that a sufficiency of evening out-patient clinics in all departments be provided. Under existing conditions the worker who is not totally incapacitated and who requires specialist advice and treatment suffers loss of time and wages and may even sacrifice his employment. At the present time such evening facilities are almost limited to the tuberculosis and V.D. services provided by the local authorities, while the evening provision of "general practitioner" treatment has always been available under the National Health Insurance service.

3. *Regulation of Out-patients' Attendances.*—An effort should be made to regulate the number of out-patients per session and to permit appointments to be made by general practitioners for patients whom they may refer to the out-patient clinics of hospitals.

4. *Senior Out-patient Medical Staff Appointments.*—The number of out-patient medical officers who hold full hospital staff appointments is quite inadequate. The result is that it is often necessary to utilise the services of the junior resident staff or of loosely attached temporary clinical assistants to deal in reasonable time with cases which essentially require the more frequent attention of members of the permanent senior staff of the department. It is suggested that the number of full staff appointments should be materially increased.

5. *Payment of Consulting Staff.*—It is essential for the improved efficiency of treatment and in the interests of the medical profession that the consulting staffs of voluntary hospitals should be paid an annual salary on a part-time basis. Non-payment encourages absenteeism on account of the prior claims of private practice.

6. *Hospital Employees' Conditions, &c.*—All voluntary hospitals should agree to observe definite standards of salaries, wages, and conditions of service for all employees. In the interests of collective bargaining, all hospital employees should be encouraged to join their appropriate trade union or organisation.

7. *Patients' Complaints.*—The present methods for dealing in some voluntary hospitals with complaints appear to be unsatisfactory and require regularisation. It is suggested that consideration should be given by the Commission to a policy whereby all complaints by patients have to be carefully considered by an appropriate local committee with a right of appeal to a representative central committee.

8. *Convalescent Hospital Treatment.*—The voluntary hospital system does not provide generally for a high standard of convalescent home treatment. Such homes that exist are usually independent and often are inadequately and inefficiently staffed and equipped and they do not provide for continuity of control and treatment. It is suggested that in order to remedy these defects there should be specialised convalescent hospitals suitably situated. An efficient convalescent system will prove to be a financial gain, for it will inevitably relieve the pressure on beds in the central hospitals.

9. *Licensing and Control of Hospitals.*—The Association is of the opinion that there is an urgent need for the establishment of a central statutory body whose responsibility would be to license and periodically inspect all hospitals and close those which are inefficient or redundant. If this was done it should be possible to plan nationally for the provision of hospital accommodation according to the needs of the population.

This memorandum is signed by Mr. Somerville Hastings, F.R.C.S. (president of the Association), Miss Esther Rickards, F.R.C.S., Dr. H. B. Morgan, and Dr. Charles Brook.

HYDROTHERAPY

A SIMPLE description of the various therapeutic procedures included under the term hydrotherapy has long been needed, and a little volume,[1] to which Sir William Hale-White contributes a foreword, admirably fulfils the purpose. The qualifications of the authors raise the expectation that the practical aspect of the subject will be thoroughly dealt with, and the reader will not be disappointed in this regard; moreover, the underlying theory is briefly and clearly explained. A short historical account introduces the subject, and then the physical principles involved and the physiological effects produced by the various methods are well described. The authors deal with every variety of bath, douche, and pack, supplying a wealth of practical detail. A brief account of methods of ventilation and of the necessary equipment of a bathing establishment is included, and also some useful observations on the care of patients undergoing treatment. Upon a few minor details there may be differences of opinion; cardiologists would probably not agree with the statement that most cardiac conditions are indications for treatment by Nauheim baths. The statement that excessive heat prevents the liberation of the volatile oil in the preparation of mustard packs is erroneous; on the contrary, the oil is set free by excessive heat and may thus cause blistering. The small book is designed primarily for students who are sitting for the examination in hydrology of the Chartered Society of Massage and Medical Gymnastics, might with advantage be read by medical students and practitioners, for the methods of treatment it describes are of great value and increasingly popular.

CORRIGENDUM.—In the list of members of the Advisory Committee on the Scientific Investigation of Crime given in THE LANCET last week (p. 265) the name of Sir Russell Scott, Permanent Under-Secretary of State to the Home Office, was omitted.

[1] Hydrotherapy: A Text-book for Students. By Ruth M. Le Quesne, Chartered Masseuse, Biophysical Assistant Teacher and Examiner in Hydrotherapy for the C.S.M.M.G.; and Mary Granville, S.R.N., Chartered Masseuse, Biophysical Assistant Teacher and Examiner in Hydrotherapy for the C.S.M.M.G. London: Cassell and Co., Ltd. 1936. Pp. 142. 6s.

NEW PREPARATIONS

AMMOKET is a pleasantly flavoured fluid preparation of ammonium mandelate for use in chronic urinary infections. Four drachms contain 3·0 grammes of mandelic acid; the other constituents are not of therapeutic importance. The dose for adults is given as 4 drachms four times daily after meals. The manufacturers, Boots Pure Drug Co., Ltd., of Nottingham, say that when Ammoket is used it is seldom necessary to give additional ammonium chloride to acidify the urine.

"BENZEDRINE" BRAND TABLETS.—Benzedrine is the proprietary name given by Smith, Kline, and French Laboratories to their brand of isomyn (β-phenylisopropylamine), a sympathomimetic compound structurally related to ephedrine and adrenaline. Benzedrine Brand Tablets (which are distributed in this country by Menley and James, Ltd., 64, Hatton-garden, London, E.C.1) contain 10 mg. of isomyn sulphate, and are given by mouth. The chief effects of the drug, in suitable doses, are stimulation of the higher centres of the central nervous system, relaxation of the smooth muscle of the gastro-intestinal tract, and a sustained rise in blood pressure. It has been used to combat the sleep attacks and cataplexy of narcolepsy; to control subjective symptoms in post-encephalitic parkinsonism; to diminish fatigue and worry; to produce intestinal relaxation before radiography; and to overcome temporary depression of blood pressure. In our own columns S. A. Peoples and E. Guttmann have described the psychological accompaniments of hypertension induced with Benzedrine, and their paper should be read by those interested (THE LANCET, 1936, i., 1107). The distributors state that Benzedrine is virtually non-toxic in therapeutic doses, and so far as is known does not induce craving or addiction; "but since its effect on mood is definitely pleasant, the use of the drug with irresponsible persons should be carefully controlled by the physician." They mention various conditions in which its administration is inadvisable, and they inform us that "investigations are in progress so that the further usefulness of this preparation can be properly evaluated."

ANTIVENOMOUS SERUM.—This serum is prepared by immunising horses against the venom of European snakes, and is sold by Allen and Hanburys Ltd. (Bethnal Green, E.2). The dose, both for children and adults, is 10 c.cm. either subcutaneously or intramuscularly. The serum is supplied in an outfit containing one ampoule and one hypodermic syringe. It is said to remain active for four years.

HYDATID FLUID.—Messrs. Allen and Hanburys also announce that they have a stock of hydatid fluid for use in the Casoni test. It is prepared, from cysts of bovine origin, by the Commonwealth Laboratories of Australia, and is put up in 1 c.cm. ampoules.

TRISAN is a mixture devised for the symptomatic relief of asthma. Its contents are given as: potassium iodide, 6·03; chloral hydrate, 7·11; soluble barbitone, 0·21; and glycerin, alcohol, sugar, aromatic flavouring, and distilled water, to 100. (The percentage of alcohol is not stated.) The advantages claimed for the remedy are that it relieves bronchial spasm, loosens mucus, and induces sleep, but can be used for long periods without losing its effect by habituation. The dose suggested is 6 drachms at bedtime until there is improvement, and then, for two or three weeks, 3 drachms. The makers are Hommel's Hæmatogen and Drug Co., 121, Norwood-road, Herne Hill, S.E.24.

WINTER IN EGYPT: INFORMATION WANTED

Dr. N. H. Oliver (Northumberland House, Richmond, Surrey) writes: Can any of your readers give me advice as to where I can obtain information about homes or hostels in Egypt? I want to send a woman patient to Egypt for the winter. She is suffering from slight tuberculosis and severe anæmia and debility. It is impossible for her to remain in England over the winter and I think Egypt would suit her. Her means are small, so that expensive hotels are out of the question.

Appointments

ANDERSON, GERALDINE, M.R.C.S. Eng., has been appointed Pathologist at the Watford and District Peace Memorial Hospital.

BENTLEY, F. H., M.B. Manch., F.R.C.S. Eng., Chief Assistant to Surgical Units at the Manchester Royal Infirmary.

BROOKE, E. B., M.B., M.R.C.P. Lond., D.P.H., Medical Superintendent at the Reigate Institution.

CATLOW, ELSIE, M.B. Manch., D.P.H., Assistant Medical Officer for Lancashire.

CURTIS, HERBERT, M.B. Camb., Hon. Assistant Anæsthetist to the West London Hospital.

FIDDES, F. S., M.B. Edin., Assistant Medical Officer of Gogarburn Certified Institution, Edinburgh.

GWILLIM, C. M., M.D., M.R.C.P. Lond., F.R.C.S. Eng., M.C.O.G., Assistant Obstetric Surgeon to St. George's Hospital.

HARLEY, HAROLD, B.M. Oxon., Hon. Medical Registrar to the Children's Department of the West London Hospital.

HARVEY, J. C., M.B., Resident Assistant Medical Officer at the Reigate Institution.

HOLROYD, G., M.R.C.S. Eng., D.P.H., Senior Assistant Medical Officer of Health and School Medical Officer for Heston and Isleworth.

KETTLE, A. B., M.D., M.R.C.P. Lond., D.P.H., Assistant Medical Officer for Lancashire.

MACKEITH, S. A., M.R.C.S. Eng., D.P.M., Deputy Medical Superintendent of the Warwickshire and Coventry Mental Hospital, Hatton.

MARTIN, J. J. B., M.D. Edin., D.P.M., Medical Superintendent of Bristol Mental Hospital.

NICHOLSON, N. J., M.B. Edin., F.R.C.S., Deputy Medical Superintendent of the Birkenhead Municipal Hospital.

ODLING-SMEE, KATHERINE, M.B. Edin., D.P.H., Assistant Medical Welfare Officer for St. Pancras.

O'SULLIVAN, J. V., M.D., N.U.I., F.R.C.S. Eng., M.R.C.P. Lond., M.C.O.G., Hon. Gynæcologist to the Poplar Hospital for Accidents.

RUSSELL, AUDREY, M.B. Lond., Assistant Medical Welfare Officer for St. Pancras.

SCOTT R. BODLEY, B.M. Oxon., M.R.C.P. Lond., Hon. Assistant Physician to the Woolwich and District Hospital.

SLAUGHTER, E. V., M.R.C.S. Eng., D.A., Hon. Anæsthetist to the Acton Hospital.

SMYTH, J. C., M.D. Manch., Hon. Physician in Charge of the Clinic of Psychological Medicine of the Royal Infirmary, Worcester.

SYMONS, H. W., M.B., F.R.C.S. Eng., Hon. Surgeon to Leeds General Infirmary.

TAYLOR, HAROLD, M.B. Camb., F.R.C.S. Eng., Obstetric Surgeon to St. George's Hospital.

TERRY, J. D., M.B. Leeds, M.R.C.P. Lond., Hon. Physician to the Royal Infirmary, Worcester.

Royal Manchester Children's Hospital, Pendlebury.—The following appointments are announced:—

THOMSON, M. L., M.D. Aberd., M.R.C.P. Lond., Hon. Assistant Physician;

BOLTON, N. W., M.B. Manch., F.R.C.S. Eng., Hon. Assistant Surgeon;

YOUNG, N. A. J., M.B. Manch., F.R.C.S. Edin., Hon. Assistant Aural Surgeon;

BURTON, H., B.M. Oxon., Resident Medical Officer.

Births, Marriages, and Deaths

BIRTHS

CROOKS.—On July 30th, at Harley-street, W., the wife of James Crooks, F.R.C.S. Eng., of a daughter.

ROSE-INNES.—On July 27th, the wife of R. H. Rose-Innes, F.R.C.S. Edin., of Oxford, of a daughter.

SHAW.—On August 4th, to Pixie, the wife of Cedric Shaw, M.B., M.R.C.P., at 19, Bentinck-street—a son.

MARRIAGES

HOGG—MOULSDALE.—On July 30th, in London, James Cecil Hogg, F.R.C.S. Eng., to Mollie Moulsdale, daughter of the late James Dalby and of Mrs. Dalby, of Rock Ferry, Cheshire.

DEATHS

HAMMOND.—On July 28th, at Grayshott, Lieut.-Colonel F. A. L. Hammond, I.M.S. (retd.).

HARPER.—On July 26th, at a London nursing-home, Charles Harold Lefebvre, M.B. Oxon, of Cookham.

HARRY.—On July 30th, at Welwyn Garden City, Lucy Beatrice Harry, M.B. Lond.

JUSTICE.—On July 27th, at Colcherne-court, S.W., Major William A. Justice, I.M.S. (retd.).

KEOGH.—On July 30th, at Warwick-square, S.W., Lieut.-General Sir Alfred Keogh, G.C.B., G.C.V.O., C.H.

KNOWLES.—On August 3rd in Calcutta, India, Lieut.-Colonel Robert Knowles, O.I.E., I.M.S., aged 53.

STANISTREET.—On July 27th, Richard Weld Stanistreet, M.R.C.S. Eng., Surg. Capt., R.N., late of Chatham.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.